

=> file reg  
FILE 'REGISTRY' ENTERED AT 15:30:43 ON 16 OCT 2002  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
COPYRIGHT (C) 2002 American Chemical Society (ACS)

=> d his  
FILE 'REGISTRY' ENTERED AT 15:14:26 ON 16 OCT 2002

L1 66 SEA (NI(L)GD)/ELS (L) 2/ELC.SUB  
E NICKEL/CN  
L2 1 SEA NICKEL/CN  
E GADOLINIUM/CN  
L3 1 SEA GADOLINIUM/CN

FILE 'HCA' ENTERED AT 15:15:53 ON 16 OCT 2002

L4 QUE 70/SC,SX OR 71/SC,SX  
L5 90387 SEA (ATOMIC? OR NUCLEAR? OR RADIOACTIV?)(2A)(FUEL? OR  
STORE# OR STORING# OR STORAG? OR SHIELD? OR CLAD? OR  
CASING# OR ENCAS? OR ENCLOS? OR ENVELOP? OR HOUSING# OR  
SHROUD? OR JACKET? OR ENWRAP? OR WRAP? OR GUARD? OR  
SCREEN?)  
L6 332503 SEA CANNISTER? OR CONTAINER? OR VESSEL? OR RECEPTACL? OR  
DRUM OR DRUMS OR BARREL?  
L7 940 SEA (NICKEL# OR NI) (2A) (GADOLINIUM# OR GD)  
L8 350 SEA L1  
L9 248262 SEA L2  
L10 21615 SEA L3  
L11 0 SEA L8 AND L5  
L12 21 SEA L8 AND L4  
L13 1 SEA L12 AND L6  
L14 38 SEA L5 AND L9 AND L10  
L15 24 SEA L14 AND L4  
L16 0 SEA L14 AND L6  
L17 1 SEA L14 AND L7  
L18 3 SEA L7 AND L5  
L19 4 SEA L7 AND L6  
L20 42 SEA L7 AND L4  
L21 7 SEA L13 OR L17 OR L18 OR L19  
L22 43 SEA (L12 OR L15) NOT L21  
L23 44 SEA (L14 OR L20) NOT (L21 OR L22)  
D COST

FILE 'REGISTRY' ENTERED AT 15:30:43 ON 16 OCT 2002

=> file hca  
FILE 'HCA' ENTERED AT 15:31:03 ON 16 OCT 2002  
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.  
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
COPYRIGHT (C) 2002 AMERICAN CHEMICAL SOCIETY (ACS)

=> d l21 1-7 cbib abs hitstr hitind

L21 ANSWER 1 OF 7 HCA COPYRIGHT 2002 ACS  
133:273131 Advanced neutron absorbers for spent fuel applications.  
Smolik, Galen R.; Branagan, D. J.; Shaber, Eric L. (Idaho National  
Engineering and Environmental Laboratory, Idaho Falls, ID,  
83415-2218, USA). Global '99: "Nuclear Technology - Bridging the  
Millennia", Proceedings of the International Conference on Future  
Nuclear Systems, Jackson Hole, WY, United States, Aug. 29-Sept. 3,

1999, 775-782. American Nuclear Society: La Grange Park, Ill.  
(English) 1999. CODEN: 69AGIT.

AB Neutron absorbers will play an important role in the long-term storage of certain types of enriched spent \*\*\*nuclear\*\*\* \*\*\*fuels\*\*\*. High n absorbing capability, long-term stability, and the capacity to stay with the fuel are important criteria in preventing crit. conditions during possible waste package degrdn. in geol. time frames. Gd contained within a relatively insol. compd. or alloy is attractive from both a cost and a n absorbing standpoint. This paper addresses studies involving the inclusion of Gd in several alloy systems which have been processed to yield amorphous, nanocryst., or microcryst. microstructures which provide good homogeneity and corrosion resistance.

CC 71-5 (Nuclear Technology)

Section cross-reference(s): 55, 56

IT Spent \*\*\*nuclear\*\*\* \*\*\*fuel\*\*\*

(advanced neutron absorbers for spent fuel applications)

IT 162395-46-2, Boron 19.8, gadolinium 1, iron 79.2 (atomic)  
237081-61-7, Boron 18.4, gadolinium 8, iron 73.6 (atomic)  
237081-62-8, Chromium 24.4, gadolinium 1, iron 3.27, molybdenum 8.12, nickel 62.4, tungsten 0.69, vanadium 0.2 (atomic)  
237081-63-9, Chromium 22.6, gadolinium 8, iron 3.04, molybdenum 7.54, nickel 58, tungsten 0.64, vanadium 0.18 (atomic)  
237081-64-0, Boron 19.8, chromium 15.8, gadolinium 1, iron 63.4 (atomic) 237081-65-1, Boron 18.4, chromium 14.7, gadolinium 8, iron 58.9 (atomic) 237081-68-4, Copper 29.7, \*\*\*gadolinium\*\*\* 1, \*\*\*nickel\*\*\* 69.3 (atomic) 237081-69-5, Copper 27.6, \*\*\*gadolinium\*\*\* 8, \*\*\*nickel\*\*\* 64.4 (atomic)  
(advanced neutron absorbers for spent fuel applications)

L21 ANSWER 2 OF 7 HCA COPYRIGHT 2002 ACS

126:38522 Separation of gadolinium isotope. Adachi, Hajime; Kuwako, Akira; Araki, Yoshio (Tokyo Shibaura Electric Co, Japan). Jpn. Kokai Tokkyo Koho JP 08276117 A2 19961022 Heisei, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1995-79253 19950405.

AB A \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* alloy is heated in a crucible and vaporized, the metal vapor is irradiated with a multi-wavelength laser to excite a specific Gd isotope and ionizes it, an elec. field is applied to it, the ions which were formed from the ionization and a portion of neutral atoms are recovered in a heated recovering \*\*\*vessel\*\*\*, the thus obtained enriched \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* alloy is recovered in liq. form, followed by chem. sepn. to obtain enriched Gd as a product. The Gd in the \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* alloy can be replaced by In, Mg, Mn, Pd or Tl. The recovery of the product and waste is easy and the prodn. of Gd isotope such as Gd-157 can be carried out economically.

IT \*\*\*58205-10-0\*\*\*

(sepn. of gadolinium isotopes by using nickel alloy)

RN 58205-10-0 HCA

CN Gadolinium alloy, nonbase, Gd,Ni (9CI) (CA INDEX NAME)

Component Component  
Registry Number

=====+=====

Gd 7440-54-2

Ni 7440-02-0

IT \*\*\*184846-64-8\*\*\*

(sepn. of isotopes by using nickel alloy)

RN 184846-64-8 HCA

CN Gadolinium alloy, base, Gd 60-85,Ni 15-40 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Gd	60 - 85	7440-54-2
Ni	15 - 40	7440-02-0

IC ICM B01D059-34

CC \*\*\*71-6\*\*\* (Nuclear Technology)

ST gadolinium isotope sepn laser irradi; \*\*\*nickel\*\*\*  
\*\*\*gadolinium\*\*\* alloy vaporization

IT \*\*\*58205-10-0\*\*\*

(sepn. of gadolinium isotopes by using nickel alloy)

IT \*\*\*184846-64-8\*\*\* 184846-65-9 184846-66-0 184846-67-1  
184846-68-2

(sepn. of isotopes by using nickel alloy)

L21 ANSWER 3 OF 7 HCA COPYRIGHT 2002 ACS

109:29491 \*\*\*Nickel\*\*\* -like \*\*\*gadolinium\*\*\* spectra from the  
PLT tokamak. Von Goeler, S.; Beiersdorfer, P.; Bitter, M.; Bell,  
R.; Hill, K.; LaSalle, P.; Ratzan, L.; Stevens, J.; Timberlake, J.;  
et al. (Plasma Phys. Lab., Princeton Univ., Princeton, NJ, 08544,  
USA). J. Phys., Colloq., C1(IAU Colloq. No. 102 UV X-ray Spectrosc.  
Astrophys. Lab. Plasmas, 1988), C1-181/C1-184 (English) 1988.  
CODEN: JPQCAK. ISSN: 0449-1947.

AB X-ray spectra at 7-9 .ANG. of Gd were measured on the PLT tokamak  
with a vacuum curved crystal spectrometer. The wavelengths were  
compared with theor. predictions from the RAC code for Fe, Co, Ni,  
Cu, and Zn-charge states.

CC 73-6 (Optical, Electron, and Mass Spectroscopy and Other Related  
Properties)

Section cross-reference(s): 71

IT \*\*\*Nuclear\*\*\* fusion reactor \*\*\*fuels\*\*\* and plasmas  
(tokamak, x-ray emission by gadolinium cations in)

L21 ANSWER 4 OF 7 HCA COPYRIGHT 2002 ACS

88:127688 Self-consistent screening of a positive muon in a  
spin-polarized electron gas. Jena, P.; Singwi, K. S.; Nieminen, R.  
M. (Mater. Res. Cent., Northwestern Univ., Evanston, Ill., USA).  
Phys. Rev. B, 17(1), 301-7 (English) 1978. CODEN: PLRBAQ. ISSN:  
0556-2805.

AB The e- spin-d. distribution around a .mu.+ was calcd.  
self-consistently for a range of metallic densities by using the  
spin-d. functional formalism. The enhancement of the spin d. at the  
.mu.+ site over the ambient polarization is considerably smaller  
than the corresponding charge-d. enhancement. The results were used  
to est. the hyperfine field at interstitial .mu.+ sites in  
ferromagnetic Fe, Co, \*\*\*Ni\*\*\*, and \*\*\*Gd\*\*\*. Comparisons  
were made with the most-recent exptl. data.

IT \*\*\*7440-02-0\*\*\*, properties \*\*\*7440-54-2\*\*\*, properties  
(magnetic hyperfine field at interstitial pos. muon sites in)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 70-6 (Nuclear Phenomena)

Section cross-reference(s): 77

IT \*\*\*Screening\*\*\* , electronic and \*\*\*nuclear\*\*\*  
(of muon (.mu.+), in spin-polarized electron gas,  
self-consistent)

IT 7439-89-6, properties \*\*\*7440-02-0\*\*\* , properties 7440-48-4,  
properties \*\*\*7440-54-2\*\*\* , properties  
(magnetic hyperfine field at interstitial pos. muon sites in)

L21 ANSWER 5 OF 7 HCA COPYRIGHT 2002 ACS

72:139116 Family of compounds of the type La<sub>6</sub>Mn<sub>2</sub>Al<sub>2</sub>S<sub>14</sub>. Collin, Gaston;  
Flahaut, Jean (Lab. Chim. Miner., Fac. Pharm., Paris, Fr.). C. R.  
Acad. Sci., Ser. C, 270(5), 488-90 (French) 1970. CODEN: CHDCAQ.

AB L<sub>6</sub>M<sub>2</sub>Al<sub>2</sub>S<sub>14</sub> (L = rare earth element La to Dy or Y; M = Mg, Mn, Fe,  
Co, Ni) were prepd. by heating mixts. of L<sub>2</sub>S<sub>3</sub> and elemental Al and M  
(or MS) at 900.degree. under H<sub>2</sub>S in graphite \*\*\*containers\*\*\*  
L<sub>6</sub>M<sub>2</sub>Al<sub>2</sub>S<sub>14</sub> (M = Ti, V, Cr, Zn, Cd) were prepd. by heating mixts. of  
L<sub>6</sub>Al<sub>2</sub>S<sub>12</sub> (preheated under H<sub>2</sub>S) and MS in silica capsules. X-ray  
diffraction studies indicated hexagonal symmetry, space group p6<sub>3</sub>,  
type Ce<sub>6</sub>Al<sub>10</sub>/3S<sub>14</sub>, with Al at tetrahedral sites and M at octahedral  
sites. The lattice parameter a decreases regularly from L = La to L  
= Dy, is max. for M = Cd, and is min. for M = Ni. The parameter c  
is approx. independent of M, increases from L = La to L = Gd, then  
remains const.

CC 78 (Inorganic Chemicals and Reactions)

IT Aluminum cadmium cerium sulfide (CdAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cadmium lanthanum sulfide (CdAlLa<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium chromium sulfide (CrAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium cobalt sulfide (CoAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium iron sulfide (FeAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium magnesium sulfide (MgAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium manganese sulfide (MnAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium nickel sulfide (NiAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium titanium sulfide (TiAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum cerium zinc sulfide (ZnAlCe<sub>3</sub>S<sub>7</sub>)  
Aluminum chromium gadolinium sulfide (CrAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum chromium lanthanum sulfide (CrAlLa<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt dysprosium sulfide (CoAlDy<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt gadolinium sulfide (CoAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt lanthanum sulfide (CoAlLa<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt neodymium sulfide (CoAlNd<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt praseodymium sulfide (CoAlPr<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt samarium sulfide (CoAlSm<sub>3</sub>S<sub>7</sub>)  
Aluminum cobalt yttrium sulfide (CoAlY<sub>3</sub>S<sub>7</sub>)  
Aluminum dysprosium iron sulfide (FeAlDy<sub>3</sub>S<sub>7</sub>)  
Aluminum dysprosium manganese sulfide (MnAlDy<sub>3</sub>S<sub>7</sub>)  
Aluminum dysprosium nickel sulfide (NiAlDy<sub>3</sub>S<sub>7</sub>)  
Aluminum gadolinium iron sulfide (FeAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum gadolinium magnesium sulfide (MgAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum gadolinium manganese sulfide (MnAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum \*\*\*gadolinium\*\*\* \*\*\*nickel\*\*\* sulfide (NiAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum gadolinium titanium sulfide (TiAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum gadolinium vanadium sulfide (VAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum gadolinium zinc sulfide (ZnAlGd<sub>3</sub>S<sub>7</sub>)  
Aluminum iron lanthanum sulfide (FeAlLa<sub>3</sub>S<sub>7</sub>)  
Aluminum iron neodymium sulfide (FeAlNd<sub>3</sub>S<sub>7</sub>)  
Aluminum iron praseodymium sulfide (FeAlPr<sub>3</sub>S<sub>7</sub>)  
Aluminum iron samarium sulfide (FeAlSm<sub>3</sub>S<sub>7</sub>)

Aluminum iron terbium sulfide (FeAlTb3S7)  
 Aluminum iron yttrium sulfide (FeAlY3S7)  
 Aluminum lanthanum magnesium sulfide (MgAlLa3S7)  
 Aluminum lanthanum manganese sulfide (MnAlLa3S7)  
 Aluminum lanthanum nickel sulfide (NaAlLa3S7)  
 Aluminum lanthanum titanium sulfide (TiAlLa3S7)  
 Aluminum lanthanum vanadium sulfide (VAlLa3S7)  
 Aluminum lanthanum zinc sulfide (ZnAlLa3S7)  
 Aluminum manganese neodymium sulfide (MnAlNd3S7)  
 Aluminum manganese praseodymium sulfide (MnAlPr3S7)  
 Aluminum manganese samarium sulfide (MnAlSm3S7)  
 Aluminum manganese yttrium sulfide (MnAlY3S7)  
 Aluminum neodymium nickel sulfide (NiAlNd3S7)  
 Aluminum nickel praseodymium sulfide (NiAlPr3S7)  
 Aluminum nickel samarium sulfide (NiAlSm3S7)  
 Aluminum nickel yttrium sulfide (NiAlY3S7)  
 (crystal structure of)

L21 ANSWER 6 OF 7 HCA COPYRIGHT 2002 ACS

72:69920 Calculation of vacuum arc melting of alloys with high vapor pressure. Tkachev, S. D. (USSR). Izv. Akad. Nauk SSSR, Metal. (5), 74-9 (Russian) 1969. CODEN: IZNMAQ.

AB Conditions for the d.c. and a.c. arc melting of metals and alloys with high vapor pressures or contg. readily vaporizable addns., can be calcd. from a series of equations developed to yield crit. operating parameters such as arc currents (Icr), magnetic field intensities (Hcr), and pressures (Pcr). The equations apply directly to d.c. operations but do not hold for ferromagnetic (Fe, \*\*\*Ni\*\*\*, Co, \*\*\*Gd\*\*\* ) metals because their vapors can form a magnetic field. Arc melting in a vacuum is successful when ionization of the vaporized metal is prevented; this occurs at operations above Icr, or at <Icr but at a superimposed magnetic field >Hcr and at pressures >Pcr. Conditions for a.c. operations can be calcd. by correcting for eddy turbulences caused by the alternating elec. field. Successful a.c. meltings were conducted by operating at resonance through the addn. of a compensating capacitor to the solenoid (inductor). Dense Cr (vacuum) melts were prepd. by using d.c. and a.c. (50, 480, and 2500 Hz) currents of 200 A, arc voltages 22-5 V, metal vapor pressures of 10-3 torr. The Hcr = 65.6 .times. 103 A/m for a 0.07-m diam. mold, 0.04-m diam. electrode, and an electrode-to- \*\*\*vessel\*\*\* voltage drop of 0.9 V.

CC 56 (Nonferrous Metals and Alloys)

L21 ANSWER 7 OF 7 HCA COPYRIGHT 2002 ACS

69:56704 High-current impulse argon arc method for the spectrographic analysis of microsamples. Svoboda, Vratislav; Kleinmann, Imrich (Inst. Res., Prod., Use Radioisotopes, Prague, Czech.). Anal. Chem., 40(10), 1534-40 (English) 1968. CODEN: ANCHAM.

AB A spectrographic technique employing the wall-stabilized, short-lasting, high-current (60-amp.) Ar arc for excitation is described. Wt. of samples should not exceed 400 .mu.g. The contamination by the radioactive sample is eliminated, since the excitation is performed in a closed \*\*\*vessel\*\*\*. The limit of detection for Sr in the more sensitive variant of anal. is 0.0005 ng.; in the less sensitive one, 0.003 ng. Other limits of detection are: for Ag, Be, Cu, Ti, Y, and Yb, 0.01-0.09 ng., for Eu, Mn, Sc, Tm, and Zr, 0.1-0.4 ng., for Ba, Dy, Er, Na, Mo, La, Ho, Pd, Tb, and Zn, 0.5-1 ng.; for Co, Bi, \*\*\*Gd\*\*\*, Fe, \*\*\*Ni\*\*\*, Cd, Lu, In, Cr, Rh, Th, and V, 1-3 ng.; for Au, B, Nd, Pb, Pr, Pt, Sb, Sm,

Sn, and Tl, 4-10 ng.; for W and As, 10-40 ng.; and for Te, 60 ng. A 2-m. spectrograph with 325-groove/mm. grating and blaze angle 19.degree. is used, so that at one exposure a broad spectral region (2000-5400 A.) with reciprocal dispersion from 1.5 to 3.5 A./mm. is covered. For arc sources burning in Ar and O atm. at discharge currents of 10-90 amp., the high-current arc sources ensure low limits of detection and lower matrix effects than low-current arcs. In an Ar atm., the line intensity is .apprx.2-fold for most elements in comparison with that of O.

CC 79 (Inorganic Analytical Chemistry)

=> d l22 1-43 ti

L22 ANSWER 1 OF 43 HCA COPYRIGHT 2002 ACS

TI Encapsulation of waste

L22 ANSWER 2 OF 43 HCA COPYRIGHT 2002 ACS

TI Encapsulation of waste

L22 ANSWER 3 OF 43 HCA COPYRIGHT 2002 ACS

TI A study on electrorefining of uranium metal in fluoride/chloride molten salt

L22 ANSWER 4 OF 43 HCA COPYRIGHT 2002 ACS

TI Investigation of the magnetic hyperfine field of  $^{111}\text{Cd}$  in the rare-earth Laves phases  $\text{RCo}_2$  and  $\text{RNi}_2$

L22 ANSWER 5 OF 43 HCA COPYRIGHT 2002 ACS

TI Fuel element for water-moderated power reactors

L22 ANSWER 6 OF 43 HCA COPYRIGHT 2002 ACS

TI Chemical analysis of matrix-graphite in spherical fuel elements

L22 ANSWER 7 OF 43 HCA COPYRIGHT 2002 ACS

TI Extraction of uranium(VI) in nitric acid solution with supercritical carbon dioxide fluid containing tributylphosphate

L22 ANSWER 8 OF 43 HCA COPYRIGHT 2002 ACS

TI Use of a direct current glow discharge mass spectrometer for the chemical characterization of samples of nuclear concern

L22 ANSWER 9 OF 43 HCA COPYRIGHT 2002 ACS

TI Trace metal assay of uranium silicide fuel

L22 ANSWER 10 OF 43 HCA COPYRIGHT 2002 ACS

TI Microparticle coating on inside of fuel rods and other fuel assembly components

L22 ANSWER 11 OF 43 HCA COPYRIGHT 2002 ACS

TI Study of isotachophoretic separation behavior of metal cations by means of particle-induced X-ray emission. VI. Selective separation of twenty metal cations using tartaric acid as a complexing agent

L22 ANSWER 12 OF 43 HCA COPYRIGHT 2002 ACS

TI Study of isotachophoretic separation behavior of metal cations by means of particle-induced x-ray emission. V. Fractionation of platinum group elements from a model solution of \*\*\*nuclear\*\*\* waste by means of continuous free-flow isotachophoresis

L22 ANSWER 13 OF 43 HCA COPYRIGHT 2002 ACS  
TI Use of total reflection x-ray fluorescence spectrometry in the analysis of nuclear reprocessing samples

L22 ANSWER 14 OF 43 HCA COPYRIGHT 2002 ACS  
TI Trace metal characterization of the uranium-aluminum matrix by atomic spectroscopy

L22 ANSWER 15 OF 43 HCA COPYRIGHT 2002 ACS  
TI Core debris chemistry and fission product behavior

L22 ANSWER 16 OF 43 HCA COPYRIGHT 2002 ACS  
TI Location of a unique site for tantalum-181 nuclei in rare earth-nickel (RNi5) compounds by TDPAC technique

L22 ANSWER 17 OF 43 HCA COPYRIGHT 2002 ACS  
TI Direct quantitative determination, using flameless atomic absorption spectroscopy, of metallic impurities and rare earths in nuclear solutions containing uranium, thorium, and fission products

L22 ANSWER 18 OF 43 HCA COPYRIGHT 2002 ACS  
TI Spark source mass spectrographical specification of mixed oxide reactor fuel for metallic and rare earth impurities

L22 ANSWER 19 OF 43 HCA COPYRIGHT 2002 ACS  
TI Direct quantitative determination of metallic and rare earth impurities in nuclear solutions containing uranium, thorium, and fission products by flameless atomic absorption spectroscopy

L22 ANSWER 20 OF 43 HCA COPYRIGHT 2002 ACS  
TI ADL1 - an atomic data library for use in computing the behavior of plasma devices including fusion reactors

L22 ANSWER 21 OF 43 HCA COPYRIGHT 2002 ACS  
TI Study of the quadrupole interaction of cadmium-111 in RNi5 compounds [R = rare earth metal]

L22 ANSWER 22 OF 43 HCA COPYRIGHT 2002 ACS  
TI The spectrographic analysis of plutonium oxide or mixed plutonium oxide/uranium oxide fuel pellets by the dried residue technique

L22 ANSWER 23 OF 43 HCA COPYRIGHT 2002 ACS  
TI Pair production by photons screening corrections for intermediate and high energies

L22 ANSWER 24 OF 43 HCA COPYRIGHT 2002 ACS  
TI Spectrochemical procedures for analytical control of eighteen general impurities and fourteen rare earth elements in uranium dioxide pellets and other uranium-base materials

L22 ANSWER 25 OF 43 HCA COPYRIGHT 2002 ACS  
TI Pair production by photons. Screening corrections for intermediate and high energies

L22 ANSWER 26 OF 43 HCA COPYRIGHT 2002 ACS  
TI Moessbauer effect in some intermetallic gadolinium compounds

L22 ANSWER 27 OF 43 HCA COPYRIGHT 2002 ACS  
TI Spectrochemical determination of trace impurities in uranium oxide by carrier distillation method using the d.c. arc cathode-central

region

- L22 ANSWER 28 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystalline structure, magnetic and magnetoelastic properties of films of GdM<sub>2</sub> compounds (M=Cr, Mn, Fe, Co, Ni, Cu, Zn) of laves phase type
- L22 ANSWER 29 OF 43 HCA COPYRIGHT 2002 ACS  
TI Transport properties of ferromagnetic systems near the critical point. Electrical resistivity
- L22 ANSWER 30 OF 43 HCA COPYRIGHT 2002 ACS  
TI Galvanomagnetic properties and phase composition of nickel-gadolinium films
- L22 ANSWER 31 OF 43 HCA COPYRIGHT 2002 ACS  
TI Heat capacity studies of intermetallic compounds containing rare earth elements
- L22 ANSWER 32 OF 43 HCA COPYRIGHT 2002 ACS  
TI Heat capacity and electrical resistivity of some lanthanide-nickel (LnNi<sub>5</sub>) compounds between 5 and 300.deg.K
- L22 ANSWER 33 OF 43 HCA COPYRIGHT 2002 ACS  
TI Thermopower anomaly in GdNi<sub>2</sub>. Spin scattering model versus static entropy model
- L22 ANSWER 34 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystallographic, magnetic, and EPR studies of rare-earth yttrium-nickel Laves phases
- L22 ANSWER 35 OF 43 HCA COPYRIGHT 2002 ACS  
TI Thermal variation of the parameters of some Laves phases TM<sub>2</sub> [consisting of yttrium and the rare-earths with cobalt and nickel]
- L22 ANSWER 36 OF 43 HCA COPYRIGHT 2002 ACS  
TI Electrical resistance near ferromagnetic Curie points
- L22 ANSWER 37 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystal structure of rare-earth nickel compounds of the type R<sub>2</sub>Ni<sub>7</sub>
- L22 ANSWER 38 OF 43 HCA COPYRIGHT 2002 ACS  
TI Ternary compounds of the NaZn<sub>13</sub> type and related types in the {La, Ce, Pr, Nd, Sm, Eu, Gd}-Ni-Si and {La, Ce, }-{Fe, Co}-Si systems
- L22 ANSWER 39 OF 43 HCA COPYRIGHT 2002 ACS  
TI Effect of the molecular field on the electrical resistivity near a magnetic transition: GdNi<sub>2</sub>
- L22 ANSWER 40 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystal structures of AB<sub>3</sub> and A<sub>2</sub>B<sub>7</sub> rare earth-nickel phases
- L22 ANSWER 41 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystal structures of intermetallic compounds of nickel with the rare-earth metals or yttrium
- L22 ANSWER 42 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystallographic structure of rare earth intermetallic compounds of the type T<sub>3</sub>Ni, where T is a rare earth or yttrium atom



L22 ANSWER 43 OF 43 HCA COPYRIGHT 2002 ACS  
TI Crystallographic and magnetic properties of alloys with the formula  $TNi_3$ , where T is yttrium or a rare earth metal

=> d 123 1-44 ti

L23 ANSWER 1 OF 44 HCA COPYRIGHT 2002 ACS  
TI Production of selected cosmogenic radionuclides by muons 1. Fast muons

L23 ANSWER 2 OF 44 HCA COPYRIGHT 2002 ACS  
TI Neutron collimator with rectangular beam profile

L23 ANSWER 3 OF 44 HCA COPYRIGHT 2002 ACS  
TI A neutron polarizer

L23 ANSWER 4 OF 44 HCA COPYRIGHT 2002 ACS  
TI Advanced neutron absorber materials

L23 ANSWER 5 OF 44 HCA COPYRIGHT 2002 ACS  
TI New screening coefficients for the hydrogenic ion model including l-splitting for fast calculations of atomic structure in plasmas

L23 ANSWER 6 OF 44 HCA COPYRIGHT 2002 ACS  
TI Multiband theory for heavy-ion neutron-pair transfer among deformed Gd nuclei

L23 ANSWER 7 OF 44 HCA COPYRIGHT 2002 ACS  
TI Impurity-induced modulations in NbSe<sub>3</sub> detected by atomic-force microscopy

L23 ANSWER 8 OF 44 HCA COPYRIGHT 2002 ACS  
TI Electron-electron interaction and antishielding constants of core shells of atoms

L23 ANSWER 9 OF 44 HCA COPYRIGHT 2002 ACS  
TI Hyperfine structure calculations for inner atomic levels

L23 ANSWER 10 OF 44 HCA COPYRIGHT 2002 ACS  
TI Spectroscopic study of gadolinium-155 and -157

L23 ANSWER 11 OF 44 HCA COPYRIGHT 2002 ACS  
TI The g-factor measurements in stable mercury isotopes

L23 ANSWER 12 OF 44 HCA COPYRIGHT 2002 ACS  
TI A method for the calculation of Sommerfeld's screening parameters .sigma.1 and .sigma.2 for experimentally unresolved spin doublets

L23 ANSWER 13 OF 44 HCA COPYRIGHT 2002 ACS  
TI The Sommerfeld screening parameter .sigma.2 and theoretically calculated energies of atomic inner shells

L23 ANSWER 14 OF 44 HCA COPYRIGHT 2002 ACS  
TI Multilayer interference structures (MIS) based on strongly absorbing substances

L23 ANSWER 15 OF 44 HCA COPYRIGHT 2002 ACS  
TI Transient K-shell hyperfine fields and deduced polarizations for single-electron carbon and oxygen ions in different ferromagnets

L23 ANSWER 16 OF 44 HCA COPYRIGHT 2002 ACS  
TI Analytical Dirac-Hartree-Fock-Slater screening function for atoms ( $Z = 1-92$ )

L23 ANSWER 17 OF 44 HCA COPYRIGHT 2002 ACS  
TI Multiple scattering of protons and alpha particles by thick foils

L23 ANSWER 18 OF 44 HCA COPYRIGHT 2002 ACS  
TI Determination of forty trace impurity elements in uranium compounds by end-on viewed ICP-AES

L23 ANSWER 19 OF 44 HCA COPYRIGHT 2002 ACS  
TI The transient magnetic field acting on swift nuclei moving in magnetized solids

L23 ANSWER 20 OF 44 HCA COPYRIGHT 2002 ACS  
TI Estimation of the effective charges in metal crystal lattices

L23 ANSWER 21 OF 44 HCA COPYRIGHT 2002 ACS  
TI Neutron-optical properties of multilayer systems with absorption

L23 ANSWER 22 OF 44 HCA COPYRIGHT 2002 ACS  
TI Identification of new isotopes in reactions with charged particles using a U-150 accelerator

L23 ANSWER 23 OF 44 HCA COPYRIGHT 2002 ACS  
TI Light nuclei as distinct probes for transient magnetic fields

L23 ANSWER 24 OF 44 HCA COPYRIGHT 2002 ACS  
TI Scaling of the transient magnetic field with the polarization density of the host

L23 ANSWER 25 OF 44 HCA COPYRIGHT 2002 ACS  
TI Electron spin resonance study of gadolinium in the nuclear cooling agent: praseodymium pentanickel single crystals

L23 ANSWER 26 OF 44 HCA COPYRIGHT 2002 ACS  
TI Stopping power and range of silicon atoms in different materials using DSAM technique

L23 ANSWER 27 OF 44 HCA COPYRIGHT 2002 ACS  
TI Sommerfeld screening parameters for the K level in x-ray spectra

L23 ANSWER 28 OF 44 HCA COPYRIGHT 2002 ACS  
TI Dilute impurity hyperfine fields. Systematics and comparison with models

L23 ANSWER 29 OF 44 HCA COPYRIGHT 2002 ACS  
TI Hyperfine interaction studies of radon in some metals and metal oxides with the alpha-gamma angular correlation method

L23 ANSWER 30 OF 44 HCA COPYRIGHT 2002 ACS  
TI Magnetic field around muon(+) in ferromagnets

L23 ANSWER 31 OF 44 HCA COPYRIGHT 2002 ACS  
TI Extraction-photometric determination of trace impurities of copper, nickel, and iron in gadolinium and lead molybdates

L23 ANSWER 32 OF 44 HCA COPYRIGHT 2002 ACS

TI Formation conditions for \*\*\*gadolinium\*\*\* \*\*\*nickel\*\*\* oxide  
(Gd<sub>2</sub>NiO<sub>4</sub>)

L23 ANSWER 33 OF 44 HCA COPYRIGHT 2002 ACS  
TI Spin polarization of electrons tunneling from films of iron, cobalt,  
\*\*\*nickel\*\*\* , and \*\*\*gadolinium\*\*\*

L23 ANSWER 34 OF 44 HCA COPYRIGHT 2002 ACS  
TI Spin polarization of tunneling electrons from films of iron, cobalt,  
\*\*\*nickel\*\*\* and \*\*\*gadolinium\*\*\*

L23 ANSWER 35 OF 44 HCA COPYRIGHT 2002 ACS  
TI Structural stability of the gadolinium-transition metal compounds  
with Fe<sub>3</sub>C structure

L23 ANSWER 36 OF 44 HCA COPYRIGHT 2002 ACS  
TI Contribution of two-phonon processes to the anomalous Hall effect

L23 ANSWER 37 OF 44 HCA COPYRIGHT 2002 ACS  
TI Electronic structure of disordered alloys

L23 ANSWER 38 OF 44 HCA COPYRIGHT 2002 ACS  
TI \*\*\*Shielding\*\*\* of \*\*\*nuclear\*\*\* charge of electron shells  
of the atom according to the Bohr model

L23 ANSWER 39 OF 44 HCA COPYRIGHT 2002 ACS  
TI Field emission from \*\*\*nickel\*\*\* , \*\*\*gadolinium\*\*\* , and  
europium sulfide evaporated onto tungsten

L23 ANSWER 40 OF 44 HCA COPYRIGHT 2002 ACS  
TI Screening constants in x-ray spectra

L23 ANSWER 41 OF 44 HCA COPYRIGHT 2002 ACS  
TI Proximity effect between superconducting and normal films

L23 ANSWER 42 OF 44 HCA COPYRIGHT 2002 ACS  
TI Numerical Hartree-Fock results for the atoms helium to radon

L23 ANSWER 43 OF 44 HCA COPYRIGHT 2002 ACS  
TI \*\*\*Nuclear\*\*\* magnetic \*\*\*shielding\*\*\* constants calculated  
from numerical Hartree-Fock wavefunctions

L23 ANSWER 44 OF 44 HCA COPYRIGHT 2002 ACS  
TI The effect of pressure on the lattice parameters. Lead sulfide and  
lead telluride and \*\*\*gadolinium\*\*\* , \*\*\*nickel\*\*\* oxide, and  
.alpha.-manganous sulfide

=> d 122 1,2,5,10,30 cbib abs hitstr hitind

L22 ANSWER 1 OF 43 HCA COPYRIGHT 2002 ACS  
137:85003 Encapsulation of waste. Maddrell, Ewan Robert (British  
Nuclear Fuels PLC, UK). Brit. UK Pat. Appl. GB 2367419 A1 20020403,  
21 pp. (English). CODEN: BAXXDU. APPLICATION: GB 2000-20405  
20000819.  
AB This method to immobilize highly active and medium active waste,  
from an advanced Purex reprocessing plant in which substantial amts.  
of the nonfuel components of a fuel assembly are dissolved during  
the head-end dissoln. step, comprises a Na phosphate glass. Wastes  
are calcined and the glass matrix formed has zirconia particles

distributed within it and dissolved in the glass there are elements from the dissolved \*\*\*nuclear\*\*\* \*\*\*fuel\*\*\* assemblies, \*\*\*cladding\*\*\*, fission products, and other radioactive species from the irradiated \*\*\*nuclear\*\*\* \*\*\*fuel\*\*\*.

IT \*\*\*7440-54-2\*\*\*, Gadolinium, properties  
(encapsulation of waste)

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IT \*\*\*7440-02-0\*\*\*, Nickel, processes  
(encapsulation of waste)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IC ICM G21F009-00

CC \*\*\*71-11\*\*\* (Nuclear Technology)

Section cross-reference(s): 57

IT Calcination

Encapsulation

Fuel assemblies

High-level radioactive wastes

\*\*\*Nuclear\*\*\* \*\*\*fuel\*\*\* element \*\*\*cladding\*\*\*

Purex fuel reprocessing

X-ray diffractometry

(encapsulation of waste)

IT 1308-38-9, Chromium oxide (Cr2O3), properties 1309-37-1, Iron oxide (Fe2O3), properties 1313-27-5, Molybdenum oxide (MoO3), properties 1313-99-1, Nickel oxide (NiO), properties 1314-23-4, Zirconia, properties \*\*\*7440-54-2\*\*\*, Gadolinium, properties 18282-10-5, Tin oxide (SnO2)  
(encapsulation of waste)

IT 7439-89-6, Iron, processes \*\*\*7440-02-0\*\*\*, Nickel, processes 7440-23-5, Sodium, processes 7440-47-3, Chromium, processes 53572-14-8, Phosphorus oxide (PO4)  
(encapsulation of waste)

L22 ANSWER 2 OF 43 HCA COPYRIGHT 2002 ACS

137:85002 Encapsulation of waste. Maddrell, Ewan Robert (British Nuclear Fuels PLC, UK). Brit. UK Pat. Appl. GB 2367418 A1 20020403, 21 pp. (English). CODEN: BAXXDU. APPLICATION: GB 2000-20404 20000819.

AB This method to immobilize highly active and medium active waste, from an advanced Purex reprocessing plant in which substantial amts. of the non-fuel components of a fuel assembly are dissolved during the head-end dissoln. step, use a sodium zirconium phosphate matrix. Wastes are calcined and the spinel phase distributed in the matrix consists of elements from the dissolved \*\*\*nuclear\*\*\* \*\*\*fuel\*\*\* \*\*\*cladding\*\*\* and fuel assembly.

IT \*\*\*7440-54-2\*\*\*, Gadolinium, properties  
(encapsulation of waste)

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IT \*\*\*7440-02-0\*\*\*, Nickel, processes

(encapsulation of waste)

RN 7440-02-0 HCA  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IC ICM G21F009-00  
CC \*\*\*71-11\*\*\* (Nuclear Technology)

Section cross-reference(s): 57

IT Calcination

Encapsulation

High-level radioactive wastes

\*\*\*Nuclear\*\*\* \*\*\*fuel\*\*\* element \*\*\*cladding\*\*\*

Purex fuel reprocessing

X-ray diffractometry

(encapsulation of waste)

IT 1308-38-9, Chromium oxide (Cr2O3), properties 1309-37-1, Iron  
oxide (Fe2O3), properties 1313-27-5, Molybdenum oxide (MoO3),  
properties 1313-59-3, Sodium oxide (Na2O), properties 1313-99-1,  
Nickel oxide (NiO), properties 1314-23-4, Zirconia, properties  
\*\*\*7440-54-2\*\*\* , Gadolinium, properties 18282-10-5, Tin oxide  
(SnO2)

(encapsulation of waste)

IT 7439-89-6, Iron, processes \*\*\*7440-02-0\*\*\* , Nickel, processes  
7440-23-5, Sodium, processes 7440-47-3, Chromium, processes  
53572-14-8, Phosphorus oxide (PO4)

(encapsulation of waste)

L22 ANSWER 5 OF 43 HCA COPYRIGHT 2002 ACS

132:314868 Fuel element for water-moderated power reactors. Savchenko,  
A. M.; Maranchak, S. V.; Lysenko, V. A.; Vatulin, A. V.  
(Gosudarstvennyi Nauchnyi Tsentr RF, Russia; Vserossiiskii). Russ.  
RU 2112287 C1 19980527 From: Izobreteniya 1998, (15), 377-78.  
(Russian). CODEN: RUXXE7. APPLICATION: RU 1996-115777 19960730.

AB Title only translated.

IT \*\*\*7440-02-0\*\*\* , Nickel, uses  
(fuel element for water-moderated power reactors comprising  
fission particles coated with)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IT \*\*\*7440-54-2\*\*\* , Gadolinium, uses  
(fuel element for water-moderated power reactors comprising  
zirconium alloy contg.)

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IC ICM G21C003-58

ICS G21C003-64; G21C021-02

CC \*\*\*71-5\*\*\* (Nuclear Technology)

IT \*\*\*Nuclear\*\*\* \*\*\*fuels\*\*\*

Water-cooled water-moderated \*\*\*nuclear\*\*\* reactors

( \*\*\*fuel\*\*\* element for water-moderated power reactors)

IT 7439-98-7, Molybdenum, uses \*\*\*7440-02-0\*\*\* , Nickel, uses

7440-03-1, Niobium, uses 7440-67-7, Zirconium, uses

(fuel element for water-moderated power reactors comprising

fission particles coated with)

IT \*\*\*7440-54-2\*\*\* , Gadolinium, uses 7440-58-6, Hafnium, uses  
(fuel element for water-moderated power reactors comprising  
zirconium alloy contg.)

L22 ANSWER 10 OF 43 HCA COPYRIGHT 2002 ACS

121:20686 Microparticle coating on inside of fuel rods and other fuel  
assembly components. Bryan, William J. (Combination Engineering,  
Inc., USA). U.S. US 5280510 A 19940118, 6 pp. (English). CODEN:  
USXXAM. APPLICATION: US 1992-951106 19920925.

AB A method for coating the inside surface of tubular components of a  
\*\*\*nuclear\*\*\* \*\*\*fuel\*\*\* assembly, including the steps of  
supporting the component within a vacuum chamber, positioning a  
source rod having a field emitter structure within the component,  
the structure being formed of material to be coated on the surface,  
and inducing an elec. current flow through the rod sufficient to  
evap. at least a portion of the emitter structure, whereby the  
evapd. material of the emitter structure is deposited on and adheres  
to the surface as a coating. Optionally, the vacuum chamber is  
back-filled with a reactive gas, and the material evapd. from the  
emitter structure chem. reacts with the gas before adhering to the  
surface. The reactive gas can be 1 of N, O, or C plasma and the  
coating adhered to the component can be 1 of a nitride, oxide, or  
carbide, resp.

IT \*\*\*7440-02-0\*\*\* , Nickel, uses \*\*\*7440-54-2\*\*\* , Gadolinium,  
uses

( \*\*\*nuclear\*\*\* \*\*\*fuel\*\*\* component coating with)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IC ICM G21C003-00

NCL 376414000

CC \*\*\*71-5\*\*\* (Nuclear Technology)

IT \*\*\*Nuclear\*\*\* reactor \*\*\*fuels\*\*\* and fuel elements  
(microparticle coating on components of)

IT 1314-23-4, Zirconium oxide (ZrO<sub>2</sub>), uses 1344-28-1, Aluminum oxide  
(Al<sub>2</sub>O<sub>3</sub>), uses \*\*\*7440-02-0\*\*\* , Nickel, uses 7440-42-8, Boron,  
uses 7440-52-0, Erbium, uses \*\*\*7440-54-2\*\*\* , Gadolinium, uses  
7440-65-5, Yttrium, uses 7440-67-7, Zirconium, uses 10043-11-5,  
Boron nitride (BN), uses 12011-60-8, Chromium carbide (CrC)  
12033-62-4, Tantalum nitride (TaN) 12045-63-5, Titanium boride  
(TiB<sub>2</sub>) 12045-64-6, Zirconium boride (ZrB<sub>2</sub>) 12069-32-8, Boron  
carbide (B<sub>4</sub>C) 12070-08-5, Titanium carbide (TiC) 12070-12-1,  
Tungsten carbide 12070-14-3, Zirconium carbide (ZrC) 12627-33-7,  
Titanium carbide nitride 24094-93-7, Chromium nitride (CrN)  
25658-42-8, Zirconium nitride (ZrN) 25817-87-2, Hafnium nitride  
(HfN) 97331-40-3 155760-15-9, Aluminum tantalum vanadium nitride  
( \*\*\*nuclear\*\*\* \*\*\*fuel\*\*\* component coating with)

L22 ANSWER 30 OF 43 HCA COPYRIGHT 2002 ACS

79:11010 Galvanomagnetic properties and phase composition of  
nickel-gadolinium films. Buravikhin, V. A.; Bochkarev, V. F.;  
Egorov, V. A.; Budanov, O. P. (USSR). Fiz. Magn. Plenok, No. 4,

33-9 From: Ref. Zh., Fiz., E. 1972, Abstr. No. 8E1516 (Russian) 1971.

AB The Hall effect and elec. resistivity of 1000-1500 .ANG. Ni-Gd (50% Gd) films were studied at -170 to 500.degree.. Annealing at 200, 300, and 400.degree. changed the properties of the film because of phase transformation.

IT \*\*\*39431-57-7\*\*\*

(elec. resistance and Hall effect in, phase transitions in relation to)

RN 39431-57-7 HCA

CN Nickel alloy, base, Ni 3-100,Gd 0-70 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Ni	30 - 100	7440-02-0
Gd	0 - 70	7440-54-2

CC \*\*\*71-2\*\*\* (Electric Phenomena)

Section cross-reference(s): 56, \*\*\*70\*\*\*

IT \*\*\*39431-57-7\*\*\*

(elec. resistance and Hall effect in, phase transitions in relation to)

=> d his l24-

FILE 'HCA' ENTERED AT 15:39:14 ON 16 OCT 2002

L24 4865 S NEUTRON?(2A) (ABSORB? OR ABSORP? OR ADSORB? OR ADSORP? O  
L25 7 S L24 AND L7  
L26 0 S L24 AND L8  
L27 14 S L9 AND L10 AND L24  
L28 19 S (L25 OR L27) NOT L21

=> d l28 1-19 cbib abs hitstr hitind

L28 ANSWER 1 OF 19 HCA COPYRIGHT 2002 ACS

134:122605 A device for neutrons optics. Welzel, Stephan  
(Hahn-Meitner-Institut Berlin G.m.b.H., Germany). Ger. Offen. DE  
19936899 A1 20010208, 10 pp. (German). CODEN: GWXXBX.  
APPLICATION: DE 1999-19936899 19990729.

AB A small device collimates and/or focuses cold neutrons. The axis of the cylindrical device is approx. aligned with the direction of the neutron flux. Cylindrical aluminum or copper layers are transparent to neutrons and act as neutron conductors. Concentric layers of either B, Cd or Gd act as \*\*\*neutron\*\*\* \*\*\*absorbers\*\*\*. A further reflecting layer, Ni foil, may be present. Instead of having snugly fitting concentric layers, the different layers may also be wrapped in a tight spiral with the axis of the device as center. The order of the layers is as follows: transparent, reflecting, and \*\*\*neutron\*\*\* \*\*\*absorbing\*\*\* layer. The layers have thicknesses of about a .mu.m or a fraction of a .mu.m. This cost effective device is small and has a reduced neutron loss.

IT \*\*\*7440-02-0\*\*\* , Nickel, uses \*\*\*7440-54-2\*\*\* , Gadolinium, uses

(a device for neutrons optics)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni  
RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IC ICM G21K001-06  
CC 71-7 (Nuclear Technology)  
IT 7429-90-5, Aluminum, uses \*\*\*7440-02-0\*\*\* , Nickel, uses  
7440-42-8, Boron, uses 7440-43-9, Cadmium, uses 7440-50-8,  
Copper, uses \*\*\*7440-54-2\*\*\* , Gadolinium, uses  
(a device for neutrons optics)

L28 ANSWER 2 OF 19 HCA COPYRIGHT 2002 ACS

133:273207 Advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials.  
Branagan, Daniel J.; Smolik, Galen R. (Bechtel BWXT Idaho, LLC,  
USA). U.S. US 6125912 A 20001003, 24 pp. (English). CODEN:  
USXXAM. APPLICATION: US 1999-243229 19990202. PRIORITY: US  
1998-PV75350 19980202.

AB A \*\*\*neutron\*\*\* \*\*\*absorbing\*\*\* material and method  
utilizing rare earth elements such as gadolinium, europium and  
samarium to form metallic glasses and/or noble base nano/microcryst.  
materials, the \*\*\*neutron\*\*\* \*\*\*absorbing\*\*\* material having  
a combination of superior neutron capture cross sections coupled  
with enhanced resistance to corrosion, oxidn. and leaching.

IT \*\*\*7440-54-2\*\*\* , Gadolinium, uses  
(advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials  
comprising)

RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IT \*\*\*7440-02-0\*\*\* , Nickel, uses  
(advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with  
enhanced resistance to corrosion. oxidn. and leaching comprising)

RN 7440-02-0 HCA  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IC ICM B22D011-06  
ICS B29B009-00; C22C038-00  
NCL 164046000  
CC 71-11 (Nuclear Technology)  
Section cross-reference(s): 56

ST \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials gadolinium resistant  
corrosion oxidn leaching; metallic glass transition metal europium  
samarium gadolinium \*\*\*neutron\*\*\* \*\*\*absorber\*\*\*

IT \*\*\*Absorbents\*\*\*  
Nanocrystalline materials  
(advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials)

IT Metallic glasses  
(advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials)

IT Corrosion  
Leaching  
Oxidation  
(advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials  
comprising Gd, Sm and Eu with enhanced resistance to)



IT Radioactive wastes  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with enhanced resistance to corrosion. oxidn. and leaching)

IT Transition metals, uses  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with enhanced resistance to corrosion. oxidn. and leaching comprising)

IT X-ray diffraction  
 (by advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials from metallic glasses contg. gadolinium, europium or samarium)

IT Phase transition  
 (from metastable cryst. to cryst.; in advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials from metallic glasses contg. gadolinium, europium or samarium)

IT Phase composition  
 (of advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with enhanced resistance to corrosion. oxidn. and leaching)

IT 12586-31-1, \*\*\*Neutron\*\*\*  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials)

IT 7440-19-9, Samarium, uses 7440-53-1, Europium, uses  
 \*\*\*7440-54-2\*\*\*, Gadolinium, uses  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials comprising)

IT 237081-62-8 237081-65-1 237081-69-5  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with enhanced resistance to corrosion. oxidn. and leaching)

IT 7439-89-6, Iron, uses \*\*\*7440-02-0\*\*\*, Nickel, uses 7440-22-4, Silver, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with enhanced resistance to corrosion. oxidn. and leaching comprising)

IT 7440-21-3, Silicon, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7723-14-0, Phosphorus, uses  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials with enhanced resistance to corrosion. oxidn. and leaching comprising base alloy contg.)

L28 ANSWER 3 OF 19 HCA COPYRIGHT 2002 ACS

133:109123 Temporal variability of atmospheric trace element concentrations over the eastern Mediterranean Sea. Gullu, G. H.; Olmez, I.; Tuncel, G. (Department of Environmental Engineering, Hacettepe University, Ankara, 06532, Turk.). Spectrochimica Acta, Part B: Atomic Spectroscopy, 55B(7), 1135-1150 (English) 2000. CODEN: SAASBH. ISSN: 0584-8547. Publisher: Elsevier Science B.V..

AB Elements and ions measured in aerosols collected from Mar. 1992 to Dec. 1993 were examd. to understand temporal variability of elemental concns. Samples were analyzed by at. \*\*\*absorption\*\*\* spectrometry, instrumental \*\*\*neutron\*\*\* activation anal., ion chromatog., and colorimetry for .apprx.40 elements and major ions. Element concns. varied greatly on time scales ranging from days to seasons. Short-term variations in concns. of pollution-derived elements were explained by transport from source regions. Short-term variations in concns. of sea-salt and crustal elements were due to the episodic nature of wind-induced particle generation mechanisms. Transport failed to explain long-term variations due to lack of seasonal changes in air mass transport patterns. Seasonal variations in concns. of anthropogenic elements were detd. by wet deposition of particles (more extensive in the wet season) and distances between source regions and sampling sites. Long-term variations in the concns. of crustal and sea-salt elements were explained by seasonal changes in their source strengths. Distant rains on the path of air masses which transport anthropogenic

particles to the eastern Mediterranean were more influential on the obsd. seasonal behavior of pollution-derived elements than local rain events.

IT \*\*\*7440-02-0\*\*\* , Nickel, occurrence \*\*\*7440-54-2\*\*\* ,  
Gadolinium, occurrence  
(meteorol. and atm. pptn. effect on short- and long-term  
variability of elemental and ionic compn. of airborne particles  
over eastern Mediterranean Sea)

RN 7440-02-0 HCA  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 59-2 (Air Pollution and Industrial Hygiene)  
IT 7429-90-5, Aluminum, occurrence 7429-91-6, Dysprosium, occurrence  
7439-89-6, Iron, occurrence 7439-91-0, Lanthanum, occurrence  
7439-92-1, Lead, occurrence 7439-95-4, Magnesium, occurrence  
7439-96-5, Manganese, occurrence 7439-97-6, Mercury, occurrence  
7440-00-8, Neodymium, occurrence \*\*\*7440-02-0\*\*\* , Nickel,  
occurrence 7440-09-7, Potassium, occurrence 7440-19-9, Samarium,  
occurrence 7440-20-2, Scandium, occurrence 7440-23-5, Sodium,  
occurrence 7440-27-9, Terbium, occurrence 7440-29-1, Thorium,  
occurrence 7440-32-6, Titanium, occurrence 7440-36-0, Antimony,  
occurrence 7440-38-2, Arsenic, occurrence 7440-45-1, Cerium,  
occurrence 7440-46-2, Cesium, occurrence 7440-47-3, Chromium,  
occurrence 7440-48-4, Cobalt, occurrence 7440-53-1, Europium,  
occurrence \*\*\*7440-54-2\*\*\* , Gadolinium, occurrence 7440-58-6,  
Hafnium, occurrence 7440-62-2, Vanadium, occurrence 7440-64-4,  
Ytterbium, occurrence 7440-66-6, Zinc, occurrence 7440-70-2,  
Calcium, occurrence 7726-95-6, Bromine, occurrence 7782-49-2,  
Selenium, occurrence 7782-50-5, Chlorine, occurrence 14798-03-9,  
Ammonium, occurrence  
(meteorol. and atm. pptn. effect on short- and long-term  
variability of elemental and ionic compn. of airborne particles  
over eastern Mediterranean Sea)

L28 ANSWER 4 OF 19 HCA COPYRIGHT 2002 ACS

131:162504 Advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials.  
Branagan, Daniel J.; Smolik, Galen R. (Lockheed Martin Idaho  
Technologies Company, USA). PCT Int. Appl. WO 9943005 A2 19990826,  
38 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR,  
BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU,  
ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD,  
MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL,  
TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU,  
TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI,  
FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG.  
(English). CODEN: PIXXD2. APPLICATION: WO 1999-US2246 19990202.  
PRIORITY: US 1998-PV73350 19980202.

AB A n absorbing material and method using rare earth elements such as  
Gd Eu and Sm to form metallic glasses and/or noble base  
nano/microcryst. materials, the n absorbing material having a  
combination of superior n capture cross sections coupled with  
enhanced resistance to corrosion, oxidn. and leaching.

IC ICM G21C

CC 71-9 (Nuclear Technology)  
 Section cross-reference(s): 56

ST \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* gadolinium samarium europium  
 metallic glass; amorphous alloy \*\*\*neutron\*\*\* \*\*\*absorber\*\*\*

IT Metallic glasses  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials)

IT Metallic glasses  
 (iron alloy; advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\*  
 materials)

IT Metallic glasses  
 (nickel alloy; advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\*  
 materials)

IT 7440-19-9, Samarium, uses 7440-53-1, Europium, uses 7440-54-2,  
 Gadolinium, uses 237081-62-8, Chromium 24.4, gadolinium 1, iron  
 3.27, molybdenum 8.12, nickel 62.4, tungsten 0.69, vanadium 0.2  
 (atomic) 237081-63-9, Chromium 22.6, gadolinium 8, iron 3.04,  
 molybdenum 7.54, nickel 58, tungsten 0.64, vanadium 0.18 (atomic)  
 237081-66-2, Boron 19.8, \*\*\*gadolinium\*\*\* 1, \*\*\*nickel\*\*\*  
 79.2 (atomic) 237081-67-3, Boron 18.4, \*\*\*gadolinium\*\*\* 8,  
 \*\*\*nickel\*\*\* 73.6 (atomic) 237081-68-4, Copper 29.7,  
 \*\*\*gadolinium\*\*\* 1, \*\*\*nickel\*\*\* 69.3 (atomic) 237081-69-5,  
 Copper 27.6, \*\*\*gadolinium\*\*\* 8, \*\*\*nickel\*\*\* 64.4 (atomic)  
 237081-70-8, Boron 19.8, copper 23.8, \*\*\*gadolinium\*\*\* 1,  
 \*\*\*nickel\*\*\* 55.4 (atomic) 237081-71-9, Boron 18.4, copper 22.1,  
 \*\*\*gadolinium\*\*\* 8, \*\*\*nickel\*\*\* 51.5 (atomic) 237081-72-0,  
 Boron 18.4, chromium 18.1, gadolinium 8, iron 2.43, molybdenum 6.03,  
 nickel 46.4, tungsten 0.52, vanadium 0.15 (atomic) 237081-73-1,  
 Boron 19.8, chromium 19.5, gadolinium 1, iron 2.61, molybdenum 6.49,  
 nickel 49.9, tungsten 0.55, vanadium 0.16 (atomic)  
 (advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* materials)

IT 162395-46-2, Boron 19.8, gadolinium 1, iron 79.2 (atomic)  
 237081-61-7, Boron 18.6, Iron 73.6, gadolinium 8 (atomic)  
 237081-64-0, Boron 19.8, chromium 15.8, gadolinium 1, iron 63.4  
 (atomic) 237081-65-1, Boron 18.4, chromium 14.7, gadolinium 8,  
 iron 58.9 (atomic)  
 (metallic glass; advanced \*\*\*neutron\*\*\* \*\*\*absorber\*\*\*  
 materials)

L28 ANSWER 5 OF 19 HCA COPYRIGHT 2002 ACS

127:284865 161Dy and 155Gd Mossbauer spectroscopy of the RTC2  
 intermetallics (R = Dy, \*\*\*Gd\*\*\* ; T = \*\*\*Ni\*\*\* , Co).  
 Onodera, Hideya; Amanai, Hidetaka; Matsuo, Satoru; Kosaka, Masashi;  
 Kobayashi, Hisao; Ohashi, Masayoshi; Yamaguchi, Yasuo (Institute for  
 Materials Research, Tohoku University, Sendai, 980-77, Japan).  
 Science Reports of the Research Institutes, Tohoku University,  
 Series A: Physics, Chemistry, and Metallurgy, 45(1), 1-10 (English)  
 1997. CODEN: SRTAA6. ISSN: 0040-8808. Publisher: Tohoku  
 University, Institute for Materials Research.

AB 161Dy and 155Gd Mossbauer spectroscopic studies on DyCoC2, DyNiC2,  
 GdCoC2, and GdNiC2 which were performed to obtain microscopic  
 information on magnetic properties are reviewed with 27 refs. The  
 expts. were done using the std. 161Tb and 155Eu Mossbauer sources  
 prepd. by neutron irradiation at the Japan Material Testing Reactor. A  
 simple ferromagnetic DyCoC2 is a good object to compare the magnetic  
 hyperfine field with the magnetic moment detd. precisely by the  
 magnetization measurement of the single cryst. sample. DyNiC2 is an  
 antiferromagnet with commensurate magnetic structure and  
 incommensurate moment-modulation structure. The magnetic hyperfine  
 field changes correspondently well with the both magnetic  
 structures. The 155Gd Mossbauer spectroscopy is useful to det. the

moment direction in the Gd compds. which are rarely studied by neutron diffraction because of large \*\*\*neutron\*\*\*  
\*\*\*absorption\*\*\* cross section of the natural Gd nuclei. The  
cryst. elec. field parameter A.degree.2 detd. from the quadrupole  
interaction acting on Gd is also useful to interpret the magnetic  
anisotropy of the other rare earth atoms in the isostructural  
compds.

CC 73-0 (Optical, Electron, and Mass Spectroscopy and Other Related  
Properties)

Section cross-reference(s): 77

IT Magnetic anisotropy

Magnetic moment

Magnetization

Mossbauer effect

(of dysprosium or \*\*\*gadolinium\*\*\* cobalt or \*\*\*nickel\*\*\*  
dicarbides)

IT 87435-13-0, \*\*\*Gadolinium\*\*\* \*\*\*nickel\*\*\* carbide (GdNiC2)

102426-29-9, Cobalt gadolinium carbide (CoGdC2)

( \*\*\*gadolinium\*\*\* -155 Mossbauer spectra and magnetic  
properties of)

L28 ANSWER 6 OF 19 HCA COPYRIGHT 2002 ACS

113:196501 Ceramic-ceramic or ceramic-metal joints, and nondestructive  
testing thereof. Tanaka, Shunichiro (Toshiba Corp., Japan). Jpn.  
Kokai Tokkyo Koho JP 02069645 A2 19900308 Heisei, 5 pp. (Japanese).  
CODEN: JKXXAF. APPLICATION: JP 1988-220510 19880905.

AB An interlayer in title joints comprises: (a) a compd. contg. an  
element having low thermal \*\*\*neutron\*\*\* \*\*\*absorption\*\*\*  
coeff. .gamma. and (b) a compd. contg. an element with high .gamma.,  
where b is uniformly dispersed in a. The bonding state is detd. by  
irradiating the joint with thermal neutrons and imaging the  
distribution of high-.gamma. element according to the intensity of  
transmitted neutrons.

IT \*\*\*7440-02-0\*\*\* , Nickel, uses and miscellaneous  
(joints with silicon nitride ceramics, nondestructive-testing of  
boron carbide-contg. interlayer in, by thermal neutrons)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

IT \*\*\*7440-54-2\*\*\* , Gadolinium, uses and miscellaneous  
(zirconia ceramic joints with interlayer contg., nondestructive  
testing of, by thermal neutrons)

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IC ICM G01N023-09

CC 57-2 (Ceramics)

IT \*\*\*7440-02-0\*\*\* , Nickel, uses and miscellaneous

(joints with silicon nitride ceramics, nondestructive-testing of  
boron carbide-contg. interlayer in, by thermal neutrons)

IT 7440-31-5, Tin, uses and miscellaneous 7440-53-1, Europium, uses  
and miscellaneous \*\*\*7440-54-2\*\*\* , Gadolinium, uses and  
miscellaneous

(zirconia ceramic joints with interlayer contg., nondestructive  
testing of, by thermal neutrons)

110:33008 Radiochemical separation by magnesium oxide adsorption and applications. Yeh, Si Jung; Lo, J. M.; Tseng, C. L. (Inst. Nucl. Sci., Natl. Tsing Hua Univ., Hsinchu, Taiwan). J. Radioanal. Nucl. Chem., 124(1), 157-70 (English) 1988. CODEN: JRNCMD. ISSN: 0236-5731.

AB The radioactive tracer technique was used to investigate the adsorption behavior of 47 ions onto hydrous magnesium oxide. Detailed studies on Co(II), Zn(II), La(III) and Ce(III) reveal that the adsorption isotherms of these ions obey Langmuir's law. Radiochem. sepn. using hydrous magnesium oxide was applied to the neutron activation anal. of NBS std. ref. materials, and satisfactory results were obtained. Hydrous magnesium oxide was also used to adsorb various ions from aq. soln. for the purpose of preconcn. which was followed by neutron activation or inductively coupled plasma-at. emission spectrometric anal. Satisfactory results have been obsd. in both methods.

IT \*\*\*7440-02-0\*\*\* , properties \*\*\*7440-54-2\*\*\* , properties  
(adsorption of, on hydrous magnesium oxide)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 79-4 (Inorganic Analytical Chemistry)

ST radiochem sepn adsorption hydrous magnesium oxide; \*\*\*neutron\*\*\*  
activation analysis \*\*\*adsorption\*\*\* magnesium oxide; atomic  
emission analysis adsorption magnesium oxide

IT Trace elements, analysis  
(detn. of, by at. emission spectrometry or \*\*\*neutron\*\*\*  
activation, \*\*\*adsorption\*\*\* sepn. on hydrous magnesium oxide  
for)

IT 7429-91-6, properties 7439-94-3, properties 7439-97-6,  
properties 7439-98-7, properties 7440-00-8, properties  
\*\*\*7440-02-0\*\*\* , properties 7440-05-3, properties 7440-09-7,  
properties 7440-10-0, properties 7440-16-6, properties  
7440-17-7, properties 7440-18-8, properties 7440-22-4,  
properties 7440-24-6, properties 7440-30-4, properties  
7440-33-7, properties 7440-36-0, properties 7440-38-2,  
properties 7440-39-3, properties 7440-43-9, properties  
7440-46-2, properties 7440-47-3, properties 7440-50-8,  
properties 7440-52-0, properties 7440-53-1, properties  
\*\*\*7440-54-2\*\*\* , properties 7440-55-3, properties 7440-58-6,  
properties 7440-60-0, properties 7440-64-4, properties  
7440-74-6, properties 7782-49-2, properties 14265-44-2,  
Phosphate, properties 24959-67-9, Bromide, properties  
(adsorption of, on hydrous magnesium oxide)

IT 7439-91-0, Lanthanum, analysis 7440-45-1, Cerium, analysis  
7440-48-4, Cobalt, analysis 7440-66-6, Zinc, analysis 7440-67-7,  
Zirconium, analysis  
(detn. of, by at. emission spectrometry or \*\*\*neutron\*\*\*  
activation, \*\*\*adsorption\*\*\* sepn. on hydrous magnesium oxide  
for)

IT 7439-89-6, Iron, analysis 7439-96-5, Manganese, analysis  
7440-19-9, Samarium, analysis 7440-20-2, Scandium, analysis

7440-23-5, Sodium, analysis  
(detn. of, by \*\*\*neutron\*\*\* activation, \*\*\*adsorption\*\*\*  
sepn. on hydrous magnesium oxide for)

L28 ANSWER 8 OF 19 HCA COPYRIGHT 2002 ACS

97:166455 Natural production of tritium in permeable rocks. Andrews, J.  
N.; Kay, R. L. F. (Sch. Chem., Univ. Bath, Bath, BA2 7AY, UK).  
Nature (London), 298(5872), 361-3 (English) 1982. CODEN: NATUAS.  
ISSN: 0028-0836.

AB The U, Th, Li, and B contents of the rock and its matrix porosity  
det. the T content of its fracture fluids. Granites with high U,  
Th, Li contents, low B content, and a low porosity may have a  
naturally maintained T content of .apprx.2.5 T.U. in H2O within the  
matrix. This has important implications for the interpretation of  
groundwater flow patterns from their T contents.

IT \*\*\*7440-02-0\*\*\* , properties \*\*\*7440-54-2\*\*\* , properties  
( \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* by, in rocks, tritium  
formation in relation to)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 53-3 (Mineralogical and Geological Chemistry)

IT 7429-90-5, properties 7439-89-6, properties 7439-95-4,  
properties 7439-96-5, properties \*\*\*7440-02-0\*\*\* , properties  
7440-09-7, properties 7440-19-9, properties 7440-23-5,  
properties 7440-32-6, properties 7440-47-3, properties  
7440-48-4, properties \*\*\*7440-54-2\*\*\* , properties 7440-70-2,  
properties 7631-86-9, properties 7782-50-5, properties  
( \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* by, in rocks, tritium  
formation in relation to)

L28 ANSWER 9 OF 19 HCA COPYRIGHT 2002 ACS

97:13778 Neutron-optical properties of multilayer systems with  
absorption. Ebisawa, Toru; Akiyoshi, Tsunekazu; Achiwa, Norio;  
Yamada, Shusaku; Okamoto, Sunao (Res. React. Inst., Kyoto Univ.,  
Osaka, 590-04, Japan). Annu. Rep. Res. React. Inst., Kyoto Univ.,  
14, 10-18 (English) 1981. CODEN: KURAAV. ISSN: 0454-9244.

AB The n optical properties of multilayer systems with absorption were  
studied with a conventional n optical calcn. including complex  
refractive index. The reflectivities of films contg. Gd were  
calcd., and a homogeneous \*\*\*Gd\*\*\* -Ti- \*\*\*Ni\*\*\* film is  
proposed as an excellent anti-reflection film. The optical  
enhancement of n absorption due to thin layer interference is  
demonstrated by calcns. of the reflectivities of optical systems  
with an absorbing film deposited on a total reflecting film. The  
redn. of the reflectivity of Ni-Ti supermirror of 25,000 .ANG. total  
thickness could be suppressed to only several percent when the  
preferable order of layer thickness distribution is chosen.

IT \*\*\*7440-02-0\*\*\* , properties  
(films, neutron reflectivities of)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni  
IT \*\*\*7440-54-2\*\*\* , properties  
(neutron reflectivities on films of)  
RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 71-8 (Nuclear Technology)  
Section cross-reference(s): 56, 70  
ST neutron reflectivity gadolinium film; \*\*\*absorption\*\*\*  
\*\*\*neutron\*\*\* optical enhancement; mirror neutron reflection  
refraction; nickel titanium supermirror neutron reflectivity  
IT Mirrors  
(super-, nickel-titanium, \*\*\*neutron\*\*\* \*\*\*absorption\*\*\*  
effects on reflectivity of)  
IT \*\*\*7440-02-0\*\*\* , properties 7440-57-5, properties  
(films, neutron reflectivities of)  
IT \*\*\*7440-54-2\*\*\* , properties 14391-32-3, properties  
(neutron reflectivities on films of)

L28 ANSWER 10 OF 19 HCA COPYRIGHT 2002 ACS

93:197046 Geochemical analyses of copper-silver-bearing rocks in the  
Spokane Formation (Belt Supergroup), Lewis and Clark County,  
Montana. Connor, J. J.; McNeal, J. M.; Crock, J. G. (Geol. Surv.,  
United States Dep. Interior, Washington, DC, USA). Geol. Surv.  
Open-File Rep. (U. S.), 79-1440, 27 pp. (English) 1979. CODEN:  
GSORDC. ISSN: 0163-0393.

AB Thirty samples were collected from 7 of the deposits in outcrop and  
37 were collected from the Alice Creek mine and analyzed for a large  
no. of elements as part of general survey of the mineral potential  
of the Rogers Pass area. The anal. methods used were x-ray  
fluorescence, at. \*\*\*absorption\*\*\* spectrometry, spectrog.,  
\*\*\*neutron\*\*\* activation, gasometry, and titrn.

IT \*\*\*7440-02-0\*\*\* , analysis \*\*\*7440-54-2\*\*\* , analysis  
(detn. of, in copper-silver-bearing rocks in Spokane formations  
in Montana)  
RN 7440-02-0 HCA  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 79-6 (Inorganic Analytical Chemistry)  
IT 7429-90-5, analysis 7429-91-6, analysis 7439-89-6, analysis  
7439-91-0, analysis 7439-92-1, analysis 7439-93-2, analysis  
7439-95-4, analysis 7439-96-5, analysis 7439-97-6, analysis  
7439-98-7, analysis 7440-00-8, analysis \*\*\*7440-02-0\*\*\* ,  
analysis 7440-03-1, analysis 7440-09-7, analysis 7440-10-0,  
analysis 7440-19-9, analysis 7440-20-2, analysis 7440-21-3,  
analysis 7440-22-4, analysis 7440-23-5, analysis 7440-24-6,  
analysis 7440-27-9, analysis 7440-29-1, analysis 7440-30-4,  
analysis 7440-31-5, analysis 7440-32-6, analysis 7440-36-0,  
analysis 7440-38-2, analysis 7440-39-3, analysis 7440-41-7,  
analysis 7440-42-8, analysis 7440-43-9, analysis 7440-44-0,

analysis 7440-45-1, analysis 7440-47-3, analysis 7440-48-4,  
analysis 7440-50-8, analysis 7440-52-0, analysis 7440-53-1,  
analysis \*\*\*7440-54-2\*\*\*, analysis 7440-55-3, analysis  
7440-56-4, analysis 7440-61-1, analysis 7440-62-2, analysis  
7440-64-4, analysis 7440-65-5, analysis 7440-66-6, analysis  
7440-67-7, analysis 7440-70-2, analysis 7704-34-9, analysis  
7723-14-0, analysis 7782-49-2, analysis  
(detn. of, in copper-silver-bearing rocks in Spokane formations  
in Montana)

L28 ANSWER 11 OF 19 HCA COPYRIGHT 2002 ACS

90:132240 Activation of elements with reactor neutrons using a  
cadmium-boron filter. Akbarov, U.; Ashrapov, T. B.; Uzakova, U.;  
Umirbekov, K. (USSR). Deposited Doc., VINITI 3203-77, 11 pp.  
Avail. VINITI (Russian) 1977.

AB The selectivity of detns. by activation with neutrons from nuclear  
reactors can be improved by using Cd-B filters. The  
\*\*\*absorption\*\*\* of \*\*\*neutrons\*\*\* by B carbide filters at 2  
thicknesses (0.2 and 1.5 g/cm<sup>2</sup>) was calcd. as a function of neutron  
energy (0.025-1000 eV). The Cd ratios and Cd-B ratios were detd.  
for elements with at. nos. 11-92.

IT \*\*\*7440-02-0\*\*\*, analysis \*\*\*7440-54-2\*\*\*, analysis  
(detn. of, by neutron activation, boron-cadmium filters in)

RN 7440-02-0 HCA  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 79-6 (Inorganic Analytical Chemistry)  
Section cross-reference(s): 71

IT 7429-90-5, analysis 7429-91-6, analysis 7439-88-5, analysis  
7439-89-6, analysis 7439-91-0, analysis 7439-94-3, analysis  
7439-95-4, analysis 7439-96-5, analysis 7439-97-6, analysis  
7439-98-7, analysis 7440-00-8, analysis \*\*\*7440-02-0\*\*\*,  
analysis 7440-03-1, analysis 7440-04-2, analysis 7440-05-3,  
analysis 7440-06-4, analysis 7440-09-7, analysis 7440-10-0,  
analysis 7440-15-5, analysis 7440-16-6, analysis 7440-17-7,  
analysis 7440-18-8, analysis 7440-19-9, analysis 7440-20-2,  
analysis 7440-21-3, analysis 7440-22-4, analysis 7440-23-5,  
analysis 7440-24-6, analysis 7440-25-7, analysis 7440-27-9,  
analysis 7440-30-4, analysis 7440-31-5, analysis 7440-32-6,  
analysis 7440-33-7, analysis 7440-36-0, analysis 7440-38-2,  
analysis 7440-39-3, analysis 7440-43-9, analysis 7440-45-1,  
analysis 7440-46-2, analysis 7440-47-3, analysis 7440-48-4,  
analysis 7440-50-8, analysis 7440-52-0, analysis 7440-53-1,  
analysis \*\*\*7440-54-2\*\*\*, analysis 7440-55-3, analysis  
7440-56-4, analysis 7440-57-5, analysis 7440-58-6, analysis  
7440-60-0, analysis 7440-61-1, analysis 7440-62-2, analysis  
7440-64-4, analysis 7440-65-5, analysis 7440-66-6, analysis  
7440-70-2, analysis 7440-74-6, analysis 7553-56-2, analysis  
7726-95-6, analysis 7782-49-2, analysis 7782-50-5, analysis  
13494-80-9, analysis  
(detn. of, by neutron activation, boron-cadmium filters in)

L28 ANSWER 12 OF 19 HCA COPYRIGHT 2002 ACS



87:94937 Determination of 22 minor and trace elements in 8 new USGS standard rocks by instrumental activation analysis with epithermal neutrons. Rowe, J. J.; Steinnes, Eiliv (U. S. Geol. Surv., Reston, Va., USA). J. Res. U. S. Geol. Surv., 5(3), 397-402 (English) 1977. CODEN: JRGSAW.

AB Epithermal neutron activation analyses results of the 8 new USGS std. rocks are compared with results by spectrog., x-ray fluorescence, at. \*\*\*absorption\*\*\*, radiochem. \*\*\*neutron\*\*\* activation, instrumental neutron activation (thermal neutrons), isotope diln. mass spectrometric, spectrofluorometric, radioisotope diln. and delayed-neutron techniques for 22 elements. Results indicate the technique to be useful and dependable esp. for Ni, Se, Rb, Sr, Mo, Ba, Tm, Ta, Th and U.

IT \*\*\*7440-02-0\*\*\*, analysis \*\*\*7440-54-2\*\*\*, analysis  
(detn. of, in std. rocks by epithermal neutron activation)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 79-6 (Inorganic Analytical Chemistry)

IT 7439-98-7, analysis 7440-00-8, analysis \*\*\*7440-02-0\*\*\*, analysis 7440-17-7, analysis 7440-19-9, analysis 7440-20-2, analysis 7440-24-6, analysis 7440-25-7, analysis 7440-27-9, analysis 7440-29-1, analysis 7440-30-4, analysis 7440-36-0, analysis 7440-39-3, analysis 7440-45-1, analysis 7440-46-2, analysis 7440-48-4, analysis 7440-53-1, analysis \*\*\*7440-54-2\*\*\*, analysis 7440-58-6, analysis 7440-61-1, analysis 7440-64-4, analysis 7782-49-2, analysis  
(detn. of, in std. rocks by epithermal neutron activation)

L28 ANSWER 13 OF 19 HCA COPYRIGHT 2002 ACS

84:81419 Measurement of burnable poison absorptions and critical assemblies. Radowsky, Alvin (United States Atomic Energy Commission, USA). Def. Publ. U. S. Pat. Off. T US 940009 19751104, 9 pp. (English). CODEN: USXXBN. APPLICATION: US 1974-472926 19740523.

AB A method and app. are described for measuring the n absorption characteristics of burnable poison elements within a nuclear reactor. A container of the same size and shape of the burnable poison element is located within the core and connected to inlet and outlet lines, has a mixing tank means, a pump, and a counting system such that various solns. having concns. of the burnable poison may be circulated through the reactor to det. various burnable poison absorption characteristics without shutting down the reactor. For example, the burnable poison comprises boric acid with a concn. ratio of Ni/boric acid of 1:20 to 1:25.

IT \*\*\*7440-02-0\*\*\*, uses and miscellaneous \*\*\*7440-54-2\*\*\*, uses and miscellaneous  
(burnable poison contg. boron and, \*\*\*neutron\*\*\*  
\*\*\*absorption\*\*\* characteristics of)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

IC G21C  
NCL 176019000R  
CC 71-7 (Nuclear Technology)  
ST burnable poison absorption crit assembly; \*\*\*neutron\*\*\*  
\*\*\*absorption\*\*\* burnable poison; boron burnable poison reactor;  
gadolinium burnable poison reactor; reactor burnable poison  
absorption; nickel burnable poison reactor  
IT Nuclear reactors  
( \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* characteristics of  
burnable poison elements in)  
IT \*\*\*7440-02-0\*\*\* , uses and miscellaneous \*\*\*7440-54-2\*\*\* , uses  
and miscellaneous  
(burnable poison contg. boron and, \*\*\*neutron\*\*\*  
\*\*\*absorption\*\*\* characteristics of)  
IT 7440-42-8, uses and miscellaneous  
(burnable poison, with gadolinium, \*\*\*neutron\*\*\*  
\*\*\*absorption\*\*\* characteristics of)

L28 ANSWER 14 OF 19 HCA COPYRIGHT 2002 ACS  
78:143389 \*\*\*Neutron\*\*\* self- \*\*\*absorption\*\*\* in activation  
analysis. Gruber, E. (Anal. Inst., Univ. Wien, Vienna, Austria).  
Fresenius' Z. Anal. Chem., 263(3), 194-202 (German) 1973. CODEN:  
ZACFAU.

AB Models were developed for the estn. of the influence of  
self-absorption in the irradiation of targets with neutrons. The effect  
of neutron flux depression was quantitatively determined by a parabolic approximation.  
Thus, its influence could be taken into consideration in practical  
activation analysis. For any usual material of approximately known composition,  
the maximum flux depression may be determined by using the equations,  
diagrams, and tables reported.

IT \*\*\*7440-02-0\*\*\* , analysis \*\*\*7440-54-2\*\*\* , analysis  
( \*\*\*neutron\*\*\* activation, self- \*\*\*absorption\*\*\*  
corrections in)

RN 7440-02-0 HCA  
CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA  
CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 79-1 (Inorganic Analytical Chemistry)  
Section cross-reference(s): 75  
ST \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* activation analysis  
IT Radiochemical analysis  
( \*\*\*neutron\*\*\* activation, self- \*\*\*absorption\*\*\*  
corrections in)  
IT Chromium alloy, nonbase, Fe 79,Cr 19,Ti 1.5,C 0.1  
Iron alloy, base  
Titanium alloy, nonbase, Fe 79,Cr 19,Ti 1.5,C 0.1  
( \*\*\*neutron\*\*\* activation, self- \*\*\*absorption\*\*\*  
corrections in)

IT 7429-91-6, analysis 7439-88-5, analysis 7439-89-6, analysis  
 7439-91-0, analysis 7439-93-2, analysis 7439-94-3, analysis  
 7439-96-5, analysis 7439-97-6, analysis 7440-00-8, analysis  
 \*\*\*7440-02-0\*\*\*, analysis 7440-04-2, analysis 7440-05-3,  
 analysis 7440-06-4, analysis 7440-10-0, analysis 7440-15-5,  
 analysis 7440-16-6, analysis 7440-18-8, analysis 7440-19-9,  
 analysis 7440-20-2, analysis 7440-22-4, analysis 7440-25-7,  
 analysis 7440-27-9, analysis 7440-29-1, analysis 7440-30-4,  
 analysis 7440-32-6, analysis 7440-33-7, analysis 7440-36-0,  
 analysis 7440-38-2, analysis 7440-42-8, analysis 7440-43-9,  
 analysis 7440-46-2, analysis 7440-47-3, analysis 7440-48-4,  
 analysis 7440-50-8, analysis 7440-52-0, analysis 7440-53-1,  
 analysis \*\*\*7440-54-2\*\*\*, analysis 7440-57-5, analysis  
 7440-58-6, analysis 7440-60-0, analysis 7440-61-1, analysis  
 7440-62-2, analysis 7440-64-4, analysis 7440-74-6, analysis  
 7553-56-2, analysis 7726-95-6, analysis 7782-49-2, analysis  
 12597-69-2, analysis  
 ( \*\*\*neutron\*\*\* activation, self- \*\*\*absorption\*\*\*  
 corrections in)

L28 ANSWER 15 OF 19 HCA COPYRIGHT 2002 ACS

66:91299 Possibility of elemental analysis by use of neutron-capture  
 .gamma.-rays due to neutrons from low-level sources. Okada, Minoru  
 Tokyo Kogyo Shikensho Hokoku, 61(10), 448-55 (Japanese) 1966.  
 CODEN: TKSHAI.

AB A chart in which thermal-neutron-capture .gamma.-rays are arranged  
 by thermal \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* cross-section and  
 .gamma.-ray energy was prepd. An attempt was made to observe  
 neutron-capture .gamma.-rays of standard samples of several  
 elements, e.g.: Gd (Gd<sub>2</sub>O<sub>3</sub>), Cd (CdO), B (H<sub>3</sub>BO<sub>3</sub>), Li (Li<sub>2</sub>C<sub>2</sub>O<sub>4</sub>), Cl  
 (BaCl<sub>2</sub>.2H<sub>2</sub>O), Ti (Ti powder), and Ni [Ni(OH)<sub>2</sub>], which were thought  
 to emit capture .gamma.-rays of relatively high intensities. A 50-  
 and a 250-mc. Ra-Be neutron source were used with H<sub>2</sub>O and paraffin  
 as moderators, resp. The scintillation spectrometer used consisted  
 of a 5 .times. 4-in. NaI crystal and a pulse-height analyzer. From  
 the expts., both signal-to-noise ratio and neutron flux were too  
 small to obtain an appreciable photopeak within several counting  
 hrs. An improved device by which the capture .gamma.-rays of Gd,  
 Sm, Cd, Dy, Cl, Co, Ag, Sc, Mn, Se, N, Ti, Ni, and Cr could be  
 detected is presented.

IT \*\*\*7440-02-0\*\*\*, analysis \*\*\*7440-54-2\*\*\*, analysis  
 (detn. of, by neutron activation)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 79 (Inorganic Analytical Chemistry)

IT 7429-91-6, analysis 7439-93-2, analysis 7439-96-5, analysis  
 \*\*\*7440-02-0\*\*\*, analysis 7440-19-9, analysis 7440-20-2,  
 analysis 7440-22-4, analysis 7440-32-6, analysis 7440-42-8,  
 analysis 7440-43-9, analysis 7440-47-3, analysis 7440-48-4,  
 analysis \*\*\*7440-54-2\*\*\*, analysis 7727-37-9, analysis  
 7782-49-2, analysis 7782-50-5, analysis  
 (detn. of, by neutron activation)

63:69598 Original Reference No. 63:12750h,12751a-b Stainless steel-gadolinium alloys. Copeland, M.; Barstow, W.; Armantrout, C.; Kato, H. (U.S. Bur. of Mines, Albany, OR). U.S. Bur. Mines, Rept. Invest., No. 6636(7), 29 pp. (English) 1965.

AB Gd may be a potential \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* for controlling powerproducing reactors because of its high thermal neutron capture cross section of 46,000 barnes. Pure Gd is reactive and must be clad to protect it from corrosion or alloyed to make it corrosion resistant. Phase relations were detd. for Gd alloyed up to 40 wt. % with 304-type stainless steel. Body-centered-cubic (b.c.c) and face-centered-cubic (f.c.c.) Fe-rich solid soln. phases and several intermetallic Gd-contg. compds. of variable compn. approximating the formulas Fe<sub>9</sub>Gd, Ni<sub>7</sub>Gd<sub>2</sub>, Ni<sub>3</sub>Gd, Fe<sub>2</sub>Gd, NiGd, and NiGd<sub>3</sub> were identified. Fe<sub>9</sub>Gd and Ni<sub>7</sub>Gd<sub>2</sub> melted at 1080.degree. at .apprx.0.-2 wt. % Gd. The m.p. of Fe<sub>9</sub>Gd increased with increasing Gd content to a plateau at .apprx.1230.degree. and 30 wt. % Gd, and the m.p. of Ni<sub>7</sub>Gd<sub>2</sub> decreased to a plateau at 900.degree. and 30 wt. % Gd, where Ni<sub>3</sub>Gd, NiGd, and Fe<sub>2</sub>Gd coexist. B.c.c. Fe solid soln. was stable from 1 to 2 wt. % Gd to higher contents, 30 wt. % Gd or more, and f.c.c. Fe up to 12 wt. % Gd below 1200.degree.. The stability of these phases above 1200.degree. was not resolved, except for the m.ps. Fabrication variables and mech. and corrosion properties of alloys contg. up to 5 wt. % Gd were studied. Equilibrating and forming operations were done best at 940-1080.degree.. Some variability in the yield and tensile strengths of alloys was noted. There was a continual decrease in ductility and impact resistance with increasing Gd contents. The resistance of the alloys to corrosion in water at 354.degree. was about the same as stainless steel.

CC 19 (Ferrous Metals and Alloys)

IT Crystal structure

(of chromium- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* alloys and compds.)

IT Corrosion and Corrosion prevention

(of chromium- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* alloys by water)

IT Iron, with gadolinium (Fe<sub>2</sub>Gd)

Iron, with gadolinium (Fe<sub>9</sub>Gd)

\*\*\*Nickel\*\*\* compounds, with \*\*\*gadolinium\*\*\* (GdNi)

\*\*\*Nickel\*\*\* compounds, with \*\*\*gadolinium\*\*\* (GdNi<sub>3</sub>)

\*\*\*Nickel\*\*\* compounds, with \*\*\*gadolinium\*\*\* (Gd<sub>2</sub>Ni<sub>7</sub>)

\*\*\*Nickel\*\*\* compounds, with \*\*\*gadolinium\*\*\* (Gd<sub>3</sub>Ni)

(in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* system)

IT Gadolinium compounds

(with indium (GdIn<sub>3</sub>), in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* -system)

IT Gadolinium compounds

(with iron (Fe<sub>9</sub>Gd), in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* system)

IT \*\*\*Gadolinium\*\*\* compounds

(with \*\*\*nickel\*\*\* (GdNi), in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* system)

IT \*\*\*Gadolinium\*\*\* compounds

(with \*\*\*nickel\*\*\* (GdNi<sub>3</sub>), in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* system)

IT \*\*\*Gadolinium\*\*\* compounds

(with \*\*\*nickel\*\*\* (Gd<sub>2</sub>Ni<sub>7</sub>), in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* system)

IT \*\*\*Gadolinium\*\*\* compounds

(with \*\*\*nickel\*\*\* (Gd<sub>3</sub>Ni), in Cr- \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* system)

IT 7440-02-0, \*\*\*Nickel\*\*\*

(system, Cr- \*\*\*Gd\*\*\* -Fe-)  
IT 7439-89-6, Iron  
(system, Cr- \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* -)  
IT 7440-47-3, Chromium  
(system, \*\*\*Gd\*\*\* -Fe- \*\*\*Ni\*\*\* -)

L28 ANSWER 17 OF 19 HCA COPYRIGHT 2002 ACS

63:68851 Original Reference No. 63:12630c-d The production of hydrogen and helium in metals during reactor irradiation. Alter, H.; Weber, C. E. (N. Am. Aviation, Inc., Canoga Park, CA). J. Nucl. Mater., 16(1), 68-73 (English) 1965.

AB The amt. of H and He produced in reactor irradiation was calcd. for 48 elements.

IT \*\*\*7440-02-0\*\*\* , Nickel \*\*\*7440-54-2\*\*\* , Gadolinium  
(neutron capture by, He and H from)

RN 7440-02-0 HCA

CN Nickel (8CI, 9CI) (CA INDEX NAME)

Ni

RN 7440-54-2 HCA

CN Gadolinium (8CI, 9CI) (CA INDEX NAME)

Gd

CC 13 (Nuclear Technology)

IT \*\*\*Neutrons\*\*\*

( \*\*\*absorption\*\*\* or capture of, in metals, He and H from)

IT 7429-90-5, Aluminum 7429-91-6, Dysprosium 7439-89-6, Iron  
7439-96-5, Manganese 7439-98-7, Molybdenum 7440-00-8, Neodymium  
\*\*\*7440-02-0\*\*\* , Nickel 7440-03-1, Niobium 7440-39-3, Barium  
7440-41-7, Beryllium 7440-43-9, Cadmium 7440-44-0, Carbon  
7440-45-1, Cerium 7440-47-3, Chromium 7440-48-4, Cobalt  
7440-52-0, Erbium \*\*\*7440-54-2\*\*\* , Gadolinium 7440-58-6,  
Hafnium 7440-60-0, Holmium 7440-69-9, Bismuth 7440-70-2,  
Calcium 13981-68-5, Magnesium, isotope of mass 26 13982-02-0,  
Europium, isotope of mass 153 13982-05-3, Lithium, isotope of mass  
7 14258-72-1, Lithium, isotope of mass 6 14280-39-8, Magnesium,  
isotope of mass 24 14304-84-8, Magnesium, isotope of mass 25  
14378-48-4, Europium, isotope of mass 151 14391-25-4, Lutetium,  
isotope of mass 175 14452-47-2, Lutetium, isotope of mass 176  
14762-74-4, Carbon, isotope of mass 13  
(neutron capture by, He and H from)

L28 ANSWER 18 OF 19 HCA COPYRIGHT 2002 ACS

63:37705 Original Reference No. 63:6690c-f Oxidation-resistant  
nickel-base alloys for \*\*\*neutron\*\*\* \*\*\*absorption\*\*\*  
Calkins, Vincent P.; Funston, Earl S.; McGurty, James A. (U.S.  
Atomic Energy Commission). US 3189445 19650615, 2 pp.  
(Unavailable). APPLICATION: US 19561231.

AB Ni-base alloys useful for control rods in neutron reactors contain  
5-25% Sm, Eu, or Gd, such alloys not being subject to the excessive  
localized heating, when neutrons are captured, that is produced in B  
control rods. The alloys were made by arc melting several times  
with a W electrode under He. With up to 10% Sm the bottoms were  
workable at 2200.degree.F., and with up to 10% Gd at 2050.degree.F.  
The Rockwell A hardness with 5% Sm was 54-55; with 10% Sm 61-62;  
with 5% Gd 59; and with 15% Gd 66. The oxide penetration after 100  
hrs. at 2200.degree.F. was 0.05 in. for the Sm alloys, and 0.01 in.  
for the Gd alloys. The Eu alloys resembled those with Sm. U.S.

Binary  
Alloy

3,189,446 (Cl. 75-171); 2 pp. Alloys contg. 1/4 as much Cr as Ni, but otherwise similar, were similarly made and studied. The hot workability was the same as without Cr, and the hardness of the alloys contg. Sm was not changed by Cr. The oxide penetration after 100 hrs. at 2200.degree.F. was 0.015 in. for the Sm alloys, and 0.007 in. for the Gd alloys. The Ni-Cr phase grains in the 5% Gd alloy were surrounded by intergranular Ni5Gd. With 25% Gd practically all the structure was Ni5Gd and the alloy was too brittle for hardness testing. The Eu alloys resembled those with Sm. Preferred alloys for \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* in reactor control rods are those contg. 5-10% Sm or Gd, about 20% Cr, and balance Ni.

NCL 075170000

CC 20 (Nonferrous Metals and Alloys)

IT Europium alloys, chromium-Ni-

Europium alloys, nickel-

\*\*\*Gadolinium\*\*\* alloys, chromium- \*\*\*Ni\*\*\* -

\*\*\*Gadolinium\*\*\* alloys, \*\*\*nickel\*\*\* -

(for \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* control rods, oxidn.-resistant)

IT Chromium alloys, \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* -

Chromium alloys, Ni-Sm-

Chromium alloys, europium-Ni-

\*\*\*Nickel\*\*\* alloy, Cr- \*\*\*Gd\*\*\* -

Nickel alloy, Cr-Sm-

\*\*\*Nickel\*\*\* alloy, \*\*\*Gd\*\*\* -

Nickel alloy, Sm-

Nickel alloy, chromium-Eu-

Nickel alloy, europium-

(for \*\*\*neutron\*\*\* - \*\*\*absorption\*\*\* control rods, oxidn.-resistant)

IT \*\*\*Nickel\*\*\* compounds, with \*\*\*gadolinium\*\*\* (GdNi5)

(in Cr- \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* alloys)

IT \*\*\*Gadolinium\*\*\* compounds

(with \*\*\*nickel\*\*\* (GdNi5), in Cr- \*\*\*Gd\*\*\* - \*\*\*Ni\*\*\* alloys)

L28 ANSWER 19 OF 19 HCA COPYRIGHT 2002 ACS

61:2707 Original Reference No. 61:391b-d Gadolinium alloys of iron, chromium, nickel, and stainless steel. Copeland, M.; Kato, H. (U.S. Bur. of Mines, Albany, OR). Proc. Conf. Rare Earth Res., 2nd, Glenwood Springs, Colo., Volume Date 1961 133-41 (Unavailable) 1962.

AB Gd is a rare earth metal with a high thermal- \*\*\*neutron\*\*\* \*\*\*absorption\*\*\* cross section that has been considered as a poison material for controlling nuclear power reactors. It is very reactive and must be protected from corrosive environment or be made corrosion resistant by alloying with other metals. These data concern phase diagrams of the systems Fe- \*\*\*Gd\*\*\* , Cr- \*\*\*Gd\*\*\* , \*\*\*Ni\*\*\* - \*\*\*Gd\*\*\* , and stainless steel (Type 304). All these alloys have properties that may preclude their application in certain power-producing reactors. The corrosion resistance is expected to be poor except for stainless steels with low Gd contents. The stainless steel Gd alloys with .ltoreq.15% Gd have good resistance to corrosion in 680.degree.F. water and 750.degree.F. steam. No formal corrosion resistance tests were run on the other alloys, but their reaction to metallographic etchants indicated poor corrosion resistance. Elemental Gd, which has poor corrosion resistance, was present in all the Cr-Gd alloys. The stainless steel-Gd alloys would be limited in high-temp. environments because of the low m.ps. of minor phases.

CC 20 (Nonferrous Metals and Alloys)  
IT Chromium alloys, gadolinium-  
Gadolinium alloys, chromium-, Fe-  
\*\*\*Gadolinium\*\*\* alloys, chromium-, \*\*\*Ni\*\*\* -  
Iron alloys, gadolinium-  
\*\*\*Nickel\*\*\* alloy, \*\*\*gadolinium\*\*\* -  
(corrosion of)  
IT 7439-89-6, Iron 7440-02-0, \*\*\*Nickel\*\*\* 7440-47-3, Chromium  
(system, \*\*\*Gd\*\*\* -)

=> d his 129-

(FILE 'HCA' ENTERED AT 15:39:14 ON 16 OCT 2002)

L29 64 S NIGD OR GDNI  
L30 2 S L29 AND (L4 OR L5 OR L24)

=> d 130 1-2 cbib abs hitstr hitind

L30 ANSWER 1 OF 2 HCA COPYRIGHT 2002 ACS

75:134204 Intermetallic compounds of rare-earth elements and nickel, cobalt or iron. Buschow, K. H. J. (Philips Res. Lab., N. V. Philips' Gloeilampenfabr., Eindhoven, Neth.). Phys. Status Solidi A, 7(1), 199-210 (English) 1971. CODEN: PSSABA.

AB A survey is given of the compn. and crystal structure of existing rare earth transition intermetallics. The relation in crystal structure of the compds. RM2, RM3, R2M7, RM5, and R2M17 is briefly discussed (R and M represent a rare earth and 3d element, resp.). The variation of the magnetic moment of the M atoms and the variation of the Curie temp. brought about by the increase of the molar fraction of the rare earth element in the various compds. is different for M being Ni, Co, or Fe. An attempt was made to explain these differences by the Friedel model of d bands in transition metals. The R-M spin interaction is antiferromagnetic and leads in general to compensation points in the magnetization vs. temp. curves. These compensation points should vary with R as  $g(g-1)J(J+1)$ . This relation is obeyed for the compds. RF3 for which magnetic data and the lattice consts. are given. A mechanism for the R-M exchange interaction is proposed. Magnetic data are also given for the compds. GdGa and GdGa<sub>0.7</sub>Cu<sub>0.3</sub>, isostructural with \*\*\*GdNi\*\*\*.

CC \*\*\*70\*\*\* (Crystallization and Crystal Structure)

L30 ANSWER 2 OF 2 HCA COPYRIGHT 2002 ACS

63:69598 Original Reference No. 63:12750h,12751a-b Stainless steel-gadolinium alloys. Copeland, M.; Barstow, W.; Armantrout, C.; Kato, H. (U.S. Bur. of Mines, Albany, OR). U.S. Bur. Mines, Rept. Invest., No. 6636(7), 29 pp. (English) 1965.

AB Gd may be a potential \*\*\*neutron\*\*\* \*\*\*absorber\*\*\* for controlling powerproducing reactors because of its high thermal neutron capture cross section of 46,000 barnes. Pure Gd is reactive and must be clad to protect it from corrosion or alloyed to make it corrosion resistant. Phase relations were detd. for Gd alloyed up to 40 wt. % with 304-type stainless steel. Body-centered-cubic (b.c.c) and face-centered-cubic (f.c.c.) Fe-rich solid soln. phases and several intermetallic Gd-contg. compds. of variable compn. approximating the formulas Fe<sub>9</sub>Gd, Ni<sub>7</sub>Gd<sub>2</sub>, Ni<sub>3</sub>Gd, Fe<sub>2</sub>Gd, \*\*\*NiGd\*\*\*, and NiGd<sub>3</sub> were identified. Fe<sub>9</sub>Gd and Ni<sub>7</sub>Gd<sub>2</sub> melted at 1080.degree. at .apprx.0.-2 wt. % Gd. The m.p. of Fe<sub>9</sub>Gd increased with increasing Gd content to a plateau at .apprx.1230.degree. and 30 wt. % Gd, and the m.p. of Ni<sub>7</sub>Gd<sub>2</sub> decreased to a plateau at 900.degree. and 30 wt. % Gd, where Ni<sub>3</sub>Gd, \*\*\*NiGd\*\*\*, and Fe<sub>2</sub>Gd coexist. B.c.c. Fe solid soln. was stable from 1 to 2 wt. % Gd to higher contents, 30 wt. % Gd or more, and f.c.c. Fe up to 12 wt. % Gd below 1200.degree.. The stability of these phases above 1200.degree. was not resolved, except for the m.ps. Fabrication variables and mech. and corrosion properties of alloys contg. up to 5 wt. % Gd were studied. Equilibrating and forming operations were done best at 940-1080.degree.. Some variability in the yield and tensile strengths of alloys was noted. There was a continual decrease in ductility and impact resistance with increasing Gd contents. The



resistance of the alloys to corrosion in water at 354.degree. was about the same as stainless steel.

CC 19 (Ferrous Metals and Alloys)

IT Iron, with gadolinium ( $\text{Fe}_2\text{Gd}$ )

Iron, with gadolinium ( $\text{Fe}_9\text{Gd}$ )

Nickel compounds, with gadolinium (  $\text{***GdNi***}$  )

Nickel compounds, with gadolinium ( $\text{GdNi}_3$ )

Nickel compounds, with gadolinium ( $\text{Gd}_2\text{Ni}_7$ )

Nickel compounds, with gadolinium ( $\text{Gd}_3\text{Ni}$ )

(in Cr-Gd-Fe-Ni system)

IT Gadolinium compounds

(with nickel (  $\text{***GdNi***}$  ), in Cr-Gd-Fe-Ni system)

=> d his l31-

(FILE 'HCA' ENTERED AT 15:39:14 ON 16 OCT 2002)

FILE 'STNGUIDE' ENTERED AT 16:39:12 ON 16 OCT 2002

FILE 'METADEX' ENTERED AT 16:40:08 ON 16 OCT 2002

L31 137 S GD\*NI/ET  
L32 3063 S GD/ET  
L33 67415 S NI/ET  
L34 4011 S L5  
L35 0 S L34 AND L31  
L36 2 S L34 AND L32 AND L33

=> d l36 1-2 all

L36 ANSWER 1 OF 2 METADEX COPYRIGHT 2002 CSA  
AN 1992(12):23-861 METADEX  
TI Determination of Trace Metals in Uranium Oxide by Inductively  
Coupled Plasma Mass Spectrometry Combined With On-Line Solvent  
Extraction.  
AU Vijayalakshmi, S. (Indira Gandhi Centre for Atomic Research);  
Prabhu, R.K. (Indira Gandhi Centre for Atomic Research); Mahalingam,  
T.R. (Indira Gandhi Centre for Atomic Research); Mathews, C.K.  
(Indira Gandhi Centre for Atomic Research)  
SO Journal of Analytical Atomic Spectrometry (Apr. 1992) 7, (3),  
565-569, Spectra, 14 ref.  
ISSN: 0267-9477  
DT Journal  
CY United Kingdom  
LA English  
AB An on-line solvent extraction technique for the determination of  
trace elements in uranium by inductively coupled plasma mass  
spectrometry is described. An aqueous solution containing U (2% m/v)  
in 1 mol dm<sup>-3</sup> nitric acid and an organic solvent that can  
effectively extract U, trioctylphosphine oxide in cyclohexane (0.2  
mol dm<sup>-3</sup>), are pumped alternately through a  
poly(tetrafluoroethylene) (PTFE) tube where they mix thoroughly. The  
organic phase containing the extracted U is removed on-line by  
allowing the solution to pass through a microporous PTFE tube which,  
being hydrophobic, selectively allows the organic phase to permeate  
through its walls. This technique facilitates rapid and sensitive  
determination of trace elements in uranium with detection levels in  
the range 1-45 ppb for La, Ce, Pr, Nd, Sm, Eu, Gd, Dy, Ho, Er, Yb,  
Ag, Ba, Cd, cobalt, Cr, Cu, indium, Li, Mn, Ni, Pb, Sr, Ti, vanadium  
and yttrium, 0.1 ppm for Al and 0.5 ppm for Fe.  
CC 23 Analysis  
CT Journal Article; Uranium: Chemical analysis; Uranium oxides:  
Chemical analysis; Trace elements: Chemical analysis; Nuclear fuels:  
Chemical analysis; Mass spectroscopy; Inductively coupled plasma;  
Solvent extraction  
ET U; La; Ce; Pr; Nd; Sm; Eu; Gd; Dy; Ho; Er; Yb; Ag; Ba; Cd; Cr; Cu;  
Li; Mn; Ni; Pb; Sr; Ti; Al; Fe

L36 ANSWER 2 OF 2 METADEX COPYRIGHT 2002 CSA  
AN 1989(5):23-302 METADEX  
TI Trace Metal Characterization of the U-Al Matrix by Atomic  
Spectroscopy.  
AU Argekar, A.A.; Thulasidas, S.K.; Kulkarni, M.J.  
CS Bhabha Atomic Research Centre

SO Nucl. Technol. (Feb. 1989) 84, (2), 196-204  
ISSN: 0029-5450

DT Journal

LA English

AB U-Al alloys with a significant enrichment of uranium with  $^{233}\text{U}$  or  $^{235}\text{U}$  serve as nuclear fuels in research reactors. The quality assurance of this fuel requires, among other things, precise knowledge that all trace metal constituents that affect neutron economy, fuel integrity, and fuel fabrication process parameters are well within the specification limits. Trace metal characterization of  $^{233}\text{U}$ -Al alloy has been carried out by atomic spectrometry. The trace metal constituents of interest are grouped into common metals (Ag, boron, Ca, Cd, cobalt, Cr, Cu, Fe, magnesium, Mn, Mo, Na, Ni, Pb, Si, Sn, Ti, vanadium, tungsten, and Zn) and lanthanides (Ce, Dy, Eu, Gd, Ho, Lu, Sm, and Tb). The elements yttrium and Zr are grouped with the latter in view of the chemical separation procedure used. The alloy samples are dissolved in 6M HCl and evaporated to dryness with nitric acid, and the residue is ignited to oxide. The common metals other than Ag are determined in the oxide samples using carrier excitation of the analyte spectra obtained using a computer-controlled multichannel direct reading spectrometer. Electrothermal atomization atomic absorption spectrometry is used for determining Ag, using the nitric acid solution of the alloy. The rare earth elements Y and Zr are determined after separation from the U-Al matrix, using a sequence of chemical procedures. In the first stage, U is separated by solvent extraction using a TnOA/xylene/HCl system and, in the second stage, Al is separated as sodium-aluminate. The trace elements are determined by a dc arc emission spectrographic method after chemical separation. Of these, Dy, Eu, Gd, and Sm are determined by inductively coupled plasma-atomic emission spectrometry also. These methods are found to be quite adequate for the requirements of U-Al alloy fuel samples. Typical detection limits of these analytes varied in the 0.01-1.25  $\mu\text{g}$  range. The precision varied in the 10-35% range. The waste generated in these processes has been treated for quantitative recovery of  $^{233}\text{U}$ . 19 ref.-AA

CC 23 ANALYSIS

CT Uranium base alloys: Chemical analysis; Nuclear fuels: Chemical analysis; Trace elements: Chemical analysis; Spectrochemical analysis

ET Al\*U; Al sy 2; sy 2; U sy 2; U-Al; U;  $^{233}\text{U}$ ; is; U is;  $^{235}\text{U}$ ;  $^{233}\text{U}$ -Al; Ag; Ca; Cd; Cr; Cu; Fe; Mn; Mo; Na; Ni; Pb; Si; Sn; Ti; Zn; Ce; Dy; Eu; Gd; Ho; Lu; Sm; Tb; Zr; Cl\*H; HCl; H cp; cp; Cl cp; Y; Al

?show files

File 2:INSPEC 1969-2002/Oct W2  
(c) 2002 Institution of Electrical Engineers  
File 6:NTIS 1964-2002/Oct W2  
(c) 2002 NTIS, Intl Cpyrght All Rights Res  
File 8:Ei Compendex(R) 1970-2002/Oct W1  
(c) 2002 Engineering Info. Inc.  
File 62:SPIN(R) 1975-2002/Sep W2  
(c) 2002 American Institute of Physics  
File 94:JICST-EPlus 1985-2002/Aug W2  
(c) 2002 Japan Science and Tech Corp(JST)  
File 103:Energy SciTec 1974-2002/Oct B1  
(c) 2002 Contains copyrighted material  
File 109:Nuclear Sci. Abs. 1948-1976  
(c) 1997 Contains copyrighted material  
File 144:Pascal 1973-2002/Oct W2  
(c) 2002 INIST/CNRS  
File 347:JAPIO Oct 1976-2002/Jun(Updated 021004)  
(c) 2002 JPO & JAPIO  
File 350:Derwent WPIX 1963-2002/UD,UM &UP=200266  
(c) 2002 Thomson Derwent

?ds

Set	Items	Description
S1	17447	NEUTRON?(2N) (ABSORB? OR ABSORP? OR ADSORB? OR ADSORP? OR S-ORB? OR SORP? OR CHEMICOSORB? OR CHEMICOSORP? OR CHEMISORB? OR CHEMISORP?)
S2	1299	(NICKEL? ? OR NI) (2N) (GADOLINIUM? ? OR GD)
S3	1686079	CANNISTER? OR CONTAINER? OR VESSEL? OR RECEPTACL? OR DRUM - OR DRUMS OR BARREL?
S4	1823	ATOMIC?(2N) (STORE? ? OR STORING? ? OR STORAG? OR SHIELD? OR CLAD? OR CASING? ? OR ENCAS? OR ENCLOS? OR ENVELOP? OR HOUSING? ? OR SHROUD? OR JACKET? OR ENWRAP? OR WRAP? OR GUARD? OR - SCREEN? OR ENCAPSUL? OR CAPSUL?)
S5	21711	NUCLEAR?(2N) (STORE? ? OR STORING? ? OR STORAG? OR SHIELD? - OR CLAD? OR CASING? ? OR ENCAS? OR ENCLOS? OR ENVELOP? OR HOUSING? ? OR SHROUD? OR JACKET? OR ENWRAP? OR WRAP? OR GUARD? OR SCREEN? OR ENCAPSUL? OR CAPSUL?)
S6	40661	RADIOACTIV?(2N) (STORE? ? OR STORING? ? OR STORAG? OR SHIELD? OR CLAD? OR CASING? ? OR ENCAS? OR ENCLOS? OR ENVELOP? OR - HOUSING? ? OR SHROUD? OR JACKET? OR ENWRAP? OR WRAP? OR GUARD? OR SCREEN? OR ENCAPSUL? OR CAPSUL?)
S7	7	S2 AND S1
S8	1	S2 AND (S4 OR S5 OR S6)
S9	5	S2 AND S3
S10	11	S7 OR S8 OR S9
S11	9	RD S10 (unique items)

?t s11/7,de/all

11/7,DE/1 (Item 1 from file: 2)  
DIALOG(R)File 2:INSPEC  
(c) 2002 Institution of Electrical Engineers. All rts. reserv.

5708112 INSPEC Abstract Number: A9721-7680-006  
Title: /sup 161/Dy and /sup 155/Gd Mossbauer spectroscopy of the RTC/sub 2/ intermetallics (R=Dy, Gd; T=Ni, Co)  
Author(s): Onodera, H.; Amanai, H.; Matsuo, S.; Kosaka, M.; Kobayashi, H.; Ohashi, M.; Yamaguchi, Y.  
Author Affiliation: Inst. for Mater. Res., Tohoku Univ., Sendai, Japan  
Journal: Science Reports of the Research Institutes, Tohoku University,

Publisher: Tohoku Univ,

Publication Date: March 1997 Country of Publication: Japan

CODEN: SRTAA6 ISSN: 0040-8808

SICI: 0040-8808(199703)45:1L:1:11MS;1-I

Material Identity Number: S027-97005

Language: English Document Type: Journal Paper (JP)

Treatment: Experimental (X)

Abstract: /sup 161/Dy and /sup 155/Gd Mossbauer spectroscopic studies on DyCoC/sub 2/, DyNiC/sub 2/, GdCoC/sub 2/ and GdNiC/sub 2/ which were performed in order to obtain microscopic information on magnetic properties are reviewed. The experiments were done using the standard /sup 161/Tb and /sup 155/Eu Mossbauer sources prepared by neutron irradiation at the Japan Material Testing Reactor. Simple ferromagnetic DyCoC/sub 2/ is a good object to compare the magnetic hyperfine field with the magnetic moment determined precisely by the magnetization measurement of the single crystalline sample. DyNiC/sub 2/ is an antiferromagnet with commensurate magnetic structure and incommensurate moment-modulation structure. The magnetic hyperfine field changes correspondingly well with both magnetic structures. It is shown that /sup 155/Gd Mossbauer spectroscopy is very useful to determine the moment direction in the Gd compounds which are rarely investigated by neutron diffraction because of large neutron absorption cross section of the natural Gd nuclei. The crystalline electric field parameter A/sub 2//sup 0/ determined from the quadrupole interaction acting on Gd is also useful to interpret the magnetic anisotropy of the other rare earth atoms in the isostructural compounds. (27 Refs)

Subfile: A

Descriptors: antiferromagnetic materials; cobalt alloys; crystal field interactions; dysprosium alloys; ferromagnetic materials; gadolinium alloys; hyperfine interactions; magnetic anisotropy; magnetic moments; magnetic structure; magnetisation; Mossbauer effect; nickel alloys; quadrupole interactions

Copyright 1997, IEE

11/7,DE/2 (Item 2 from file: 2)

DIALOG(R) File 2:INSPEC

(c) 2002 Institution of Electrical Engineers. All rts. reserv.

01923405 INSPEC Abstract Number: A82096062

Title: Neutron-optical properties of multilayer systems with absorption

Author(s): Ebisawa, T.; Akiyoshi, T.; Achiwa, N.; Yamada, S.; Okamoto, S.

Author Affiliation: Res. Reactor Inst., Kyoto Univ., Osaka, Japan

Journal: Annual Reports of the Research Reactor Institute, Kyoto University vol.14 p.10-18

Publication Date: 1981 Country of Publication: Japan

CODEN: KURAAV ISSN: 0454-9244

Language: English Document Type: Journal Paper (JP)

Treatment: Theoretical (T)

Abstract: Neutron optical properties of multilayer systems with absorption are studied by a conventional neutron optical calculation including complex refractive index. The reflectivities of films containing Gd are calculated and a homogeneous Gd-Ti-Ni film is proposed as an excellent anti-reflection film. The optical enhancement of neutron absorption due to thin layer interference is demonstrated by calculations of the reflectivities of optical systems with an absorbing film deposited on a total reflecting film. It is found that the reduction of the reflectivity of Ni-Ti supermirror of 25000 AA in total thickness could be suppressed to only several percent when the preferable order of layer thickness distribution is chosen. (8 Refs)

Subfile: A

Descriptors: neutron transport theory; particle beam diagnostics;  
particle optics

11/7,DE/3 (Item 1 from file: 8)  
DIALOG(R)File 8:Ei Compendex(R)  
(c) 2002 Engineering Info. Inc. All rts. reserv.

06160660

E.I. No: EIP02417137720

Title: Development of nickel-chromium-molybdenum-gadolinium alloys for  
controlling nuclear criticality

Author: Baratta, Anthony; Bartlett, John W.; Brodsky, Robert; Brolin,  
Edson C.; Hendrickson, Tom A.; Hurt, Nathan H.; Jordan, Robert P.; Patti,  
Francis J.; Rosenberg, Richard

Source: Center for Research and Technology Development, (Publication)  
CRTD, American Society of Mechanical Engineers v 64 2002. p 565-569

Publication Year: 2002

CODEN: CRTDED

Language: English

Document Type: JA; (Journal Article) Treatment: G; (General Review)

Journal Announcement: 0210W2

Abstract: The proposal for the investigation of the corrosion resistance  
of a new class of alloys in which the neutron-absorbing element  
gadolinium is alloyed into nickel-based alloys is reviewed. The main  
observation is that the design of the project appears to be consistent  
with ASTM standard methods for determining corrosion resistance of metals,  
and ASME Boiler and Pressure Vessel Code requirements for mechanical  
properties and weldability of metals. In view of this, it is recommended  
that the submission be considered for support. (Edited abstract)

Descriptors: \*Nickel alloys; Criticality (nuclear fission); Spent fuels;  
Neutron absorption; Radioactive waste storage; Corrosion; Sodium chloride;  
Electrochemistry; Metallographic microstructure; Gravimetric analysis;  
Chemical analysis; Microscopic examination; Absorption spectroscopy

11/7,DE/4 (Item 1 from file: 109)  
DIALOG(R)File 109:Nuclear Sci. Abs.  
(c)1997 Contains copyrighted material. All rts. reserv.

187731 NSA-16-011775

SUMMARY TECHNICAL REPORT ON FEED MATERIALS FOR THE PERIOD APRIL 1, 1959  
TO JUNE 30, 1959

Simmons, J.W. ed.

National Lead Co. of Ohio, Cincinnati

Publication Date: July 20, 1959 83 p.

Primary Report No.: NLCO-790

Journal Announcement: NSA16

Document Type: Report

Language: English

Contract No.: AT(30-1)-1156

Anaconda Acl'd, Kermac, Moab, Rifle, and Texas Zinc uranium concentrates  
were evaluated (the laboratory portion of feed material evaluation).  
Laboratory equilibrium tests and Pilot Plant 2-inch-column extraction tests  
demonstrated effective distribution of uranium into a TBPkerosene solvent  
from aqueous phases containing as little as 0.5N HNO<sub>3</sub> and varying  
amounts of added metal nitrates (NaNO<sub>3</sub>). The concentration of  
associated nitric acid in dilute aqueous nitric acid solutions was  
determined after values were obtained for the equilibrium constant for the

reaction of tri-n-butyl phosphate with associated nitric acid and for the equilibrium distribution constant for the partition of associated nitric acid into tri-n-butyl phosphate. Optimum partition of uranium into tri-n-butyl phosphate was realized in the laboratory by using an aqueous uranyl nitrate solution containing sufficient hydrogen ions to promote extraction and a low concentration of associated nitric acid. An Ohmart system for controlling the uranium profile in the 'A' extraction column was installed on Refinery pulse columns. Use of this system improved control but did not stop all column upsets. The effect of 13 to 189 ppm sodium contamination upon hydrofluorination conversion of temperature at the site of the reaction. Uranyl sulfate was shown to undergo an enantiotropic transition at 755 deg C and to decompose to  $U_3O_8$  in an atmosphere of oxygen sulfur dioxide, which gases are evolved during decomposition. Decontamination of sodium, calcium, nickel, magnesium, gadolinium, and dysprosium was achieved in a laboratory investigation of the ADU process.  $UO_2$  produced by reductions programmed from 700 to 1100 deg F was hydrofluorinated at programmed temperatures of 550 to 1100 deg F and isothermally at 1100 deg F. Good conversion was obtained for material whose source was ADU calcined at 1200 deg F. Uranium derbies were classified by the present method of derby grading and were then examined for slag coverage, slag volume, and slag weight. There was a high degree of overlap of these parameters for adjacent grades. A hydraulic separator for separating uranium from magnesium and magnesium fluoride was fabricated. Excellent separation was obtained for +16 mesh material. A hydrochloric acid dissolution-UF<sub>4</sub> precipitation process for routing scrap materials to the reduction-to-metal step was examined. The purification obtained was noted, and process conditions were varied to determine their effect upon UF<sub>4</sub> density, UF<sub>4</sub> purity and precipitation time. Three types of uranium scrap were subjected to the HCl dissolution-aqueous precipitation Winlo process to determine the purification achieved. Green salt made from dolomitic bomb liner residues was found to be grossly contaminated. Acceptable green salt was made from pickle liquor treated with formaldehyde and from pickle liquor plus black oxide. Nominal 80% yields were obtained in the recovery of magnesium metal by reaction of calcium carbide with magnesium fluoride slag and in the recovery of HF by the reaction of sulfuric acid with magnesium fluoride slag. A sample holder for use in quantitative preferred orientation studies was fabricated. The holder, designed to fit a North American Philips Goniometer, will accommodate specimens up to 1 13/16 inches in diameter and incorporates a precision ball bearing. A satisfactory technique was developed for the analysis of uranium metal for traces of fluoride. A direct flame photometric method is given for the determination of magnesium in uranium ore concentrates. No chemical separation step is required, except for high-iron-content ores. (auth)

Descriptors: ACIDITY BUTYL PHOSPHATES CHEMICAL REACTIONS COLORADO COMPLEXES CONCENTRATION CONTROL DISTRIBUTION ENRICHMENT EXTRACTION COLUMNS KEROSENE NEW MEXICO NITRIC ACID ORE PROCESSING ORES PARTITION PETROLEUM PILOT PLANT PULSE COLUMNS PULSES QUANTITATIVE ANALYSIS QUANTITY RATIO SEPARATION PROCESSES SODIUM NITRATES SOLVENT EXTRACTION SOLVENTS TBP TESTING URANIUM COMPOUNDS URANIUM CONCENTRATES URANIUM ORES URANYL NITRATES UTAH WATER ZINC; CHEMICAL REACTIONS FLUORIDES FLUORINATION HYDROFLUORIC ACID IMPURITIES SODIUM COMPOUNDS TEMPERATURE TRACE AMOUNTS URANIUM DIOXIDE; ALLOTROPY DECOMPOSITION HIGH TEMPERATURE OXYGEN PYROLYSIS RECRYSTALLIZATION SULFATES SULFUR OXIDES TRANSIENTS URANYL COMPOUNDS  $U_3O_8$ ; ADU CALCINATION CALCIUM COMPOUNDS CHEMICAL REACTIONS DECONTAMINATION DYSPROSIUM COMPOUNDS FLUORINATION GADOLINIUM COMPOUNDS HIGH TEMPERATURE HYDROFLUORIC ACID IMPURITIES MAGNESIUM COMPOUNDS NICKEL COMPOUNDS PRODUCTION PYROLYSIS REDUCTION SEPARATION PROCESSES SLAGS SODIUM COMPOUNDS TEMPERATURE TESTING URANIUM URANIUM DIOXIDE VOLUME WEIGHT; CYCLONE SEPARATORS EFFICIENCY FABRICATION GRAIN SIZE HYDRAULICS MAGNESIUM MAGNESIUM FLUORIDES SEPARATION

PROCESSES URANIUM; ALDEHYDES CALCIUM COMPOUNDS DENSITY DOLOMITE FORMIC ACID  
HYDROFLUORIC ACID IMPURITIES LEACHING MAGNESIUM CARBONATES PRECIPITATION  
PRESSURE VESSELS QUANTITATIVE ANALYSIS REDUCTION RESIDUES SOLUTIONS TESTING  
URANIUM URANIUM COMPOUNDS URANIUM TETRAFLUORIDE U3O8 VELOCITY WASTE  
PROCESSING WATER WINLO PROCESS; CALCIUM CARBIDES CHEMICAL REACTIONS  
EFFICIENCY HYDROFLUORIC ACID LOSSES MAGNESIUM MAGNESIUM FLUORIDES RECOVERY  
SLAGS SULFURIC ACID; BEARINGS CONFIGURATION GONIOMETERS INSTRUMENTS  
LABORATORY EQUIPMENT SAMPLING VESSELS; FLUORIDES QUALITATIVE ANALYSIS TRACE  
AMOUNTS URANIUM; CHEMICAL REACTIONS COMBUSTION IRON COMPOUNDS MAGNESIUM  
COMPOUNDS ORE PROCESSING PHOTOMETRY QUALITATIVE ANALYSIS QUANTITATIVE  
ANALYSIS SEPARATION PROCESSES URANIUM ORES

11/7,DE/5 (Item 2 from file: 109)  
DIALOG(R)File 109:Nuclear Sci. Abs.  
(c)1997 Contains copyrighted material. All rts. reserv.

142357 NSA-14-025913  
IMPROVEMENTS RELATING TO NEUTRON-ABSORBING BODIES FOR USE IN NUCLEAR  
REACTORS

Worn, D.K.; Bradbury, E.J.  
Patent No.: GB 838442 Assignee: Mond Nickel Co., Ltd.  
Publication Date: June 22, 1960 v p.  
Journal Announcement: NSA14  
Document Type: Patent  
Language: English

Fuctile reactor control rods can be made from a discrete phase of  
neutron-absorbing material dispersed in a matrix if the phase is made  
coarse enough to be retained on a 200-mesh B.S.S. screen, but fine enough  
to pass through a 60-mesh B.S.S. screen. Suitable phase-matrix combinations  
that are stable up to 900 deg C are boron carbide and copper, gadolinium  
oxide and nickel or iron, and europium oxide and nickel or iron. The shaped  
sintered bodies may be covered by stainless steel or other  
corrosion-resistant alloys. (D. L.C.)

Descriptors: ABSORPTION; BORON CARBIDES; COATING; CONTROL ELEMENTS;  
COPPER; CORROSION PROTECTION; DISPERSIONS; EUROPIUM OXIDES; GADOLINIUM  
OXIDES; GRAIN SIZE; IRON; NEUTRONS; NICKEL; PATENT; REACTORS; RODS;  
SINTERED MATERIALS; STABILITY; STAINLESS STEELS; TEMPERATURE; USES

11/7,DE/6 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2002 Thomson Derwent. All rts. reserv.

014670032  
WPI Acc No: 2002-490736/200252

Mixed oxide, used as photocatalyst, is synthesized using synthesis robot  
directly in suitable reaction vessels and tested by radiation with  
visible or UV light for photocatalytic degradation of organic compounds  
Patent Assignee: STUDIENGESELLSCHAFT KOHLE MBH (STUD )  
Inventor: KISCH H; LETTMANN C; MAIER W F  
Number of Countries: 022 Number of Patents: 001  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200251546	A1	20020704	WO 2001EP14012	A	20011130	200252 B

Priority Applications (No Type Date): DE 1064317 A 20001222

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 200251546	A1	G	29	B01J-035/00	



Designated States (National): CA JP US

Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU  
MC NL PT SE TR

Abstract (Basic): WO 200251546 A1

Abstract (Basic):

NOVELTY - Mixed oxide contains up to 99 mol.% of one or more oxides of Sn, W, V, Ga, In, Cd, Zn, Nb, Pb, Co, Cr, Fe, Zr, Bi, Cu or Hf; and up to 50 mol.% of one or more oxides of Pt, Pd, C, Rh, Ru, Gd, Ce, Ni, Ir, Au, Ag, Nd, Pr, Ce, Re, Au, Tb, Ca, Mn, Ta, Ho, Sm, Ta or B. They are synthesized using a synthesis robot directly in suitable reaction vessels and tested by radiation with visible or UV light for photocatalytic degradation of organic compounds.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for;

(1) A process for the high throughput screening of mixed oxides containing up to 99 mol.% of one or more oxides of Sn, W, V, Ga, In, Cd, Zn, Nb, Pb, Co, Cr, Fe, Zr, Bi, Cu or Hf; and up to 50 mol.% of one or more oxides of Pt, Pd, C, Rh, Ru, Gd, Ce, Ni, Ir, Au, Ag, Nd, Pr, Ce, Re, Au, Tb, Ca, Mn, Ta, Ho, Sm, Ta or B; and

(2) A catalyst material as above.

Preferred Features: The testing process comprises adding contaminated water or air and measuring the impurity by radiating. The impurity is 4-chlorophenol. The reaction vessel are microtiter plates. Mass spectrometry or chromatography is used in the testing process.

USE - Used as a photocatalyst.

ADVANTAGE - Pollutant emissions are reduced.

pp; 29 DwgNo 0/5

Title Terms: MIX; OXIDE; PHOTOCATALYST; SYNTHESIS; SYNTHESIS; ROBOT; SUIT;  
REACT; VESSEL; TEST; RADIATE; VISIBLE; ULTRAVIOLET; LIGHT; PHOTOCATALYST;  
DEGRADE; ORGANIC; COMPOUND

Derwent Class: J04

International Patent Class (Main): B01J-035/00

International Patent Class (Additional): B01J-023/00

11/7,DE/7 (Item 2 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2002 Thomson Derwent. All rts. reserv.

011317477

WPI Acc No: 1997-295381/199727

Stainless steel having good thermal neutron absorbing ability - contains manganese@, nickel@, chromium@, boron, gadolinium, aluminium@, yttrium, molybdenum@, and iron@

Patent Assignee: SUMITOMO METAL IND LTD (SUMQ )

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 9111414	A	19970428	JP 95272217	A	19951020	199727 B
JP 3237486	B2	20011210	JP 95272217	A	19951020	200203

Priority Applications (No Type Date): JP 95272217 A 19951020

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 9111414	A		6	C22C-038/00	
JP 3237486	B2		6	C22C-038/00	Previous Publ. patent JP 9111414

Abstract (Basic): JP 9111414 A

The stainless steel contains, (unit: wt%), less than 0.02. C: less than 0.5 Si: 0.1-0.9 Mn: less than 0.03 P: less than 0.01 S: 7-22 Ni:

18-26 Cr: 0.9-1.8 B: 0.05-1.50 Gd: 0.005-0.10 Al: less than 0.030 N: less than 0.30 P: 3.0 Mo: Fe and unavoidable impurities: the balance. The contents of B (wt%) and Gd (wt%) satisfy condition:  $((B(1-0.015B)) \text{ plus } 4.4Gd)$  is more than 2. The Fe equivalent: Fe.eq. is between - 11 and - 5, where  $Fe.eq = Ni.eq - 1.4 Cr.eq + 11.6$ , and  $Ni.eq = Ni + 0.5 Mn + 30(C + N) - 3B$ , and  $Cr.eq = Cr + 1.5Si + Mo$ , where unit is wt%.

ADVANTAGE - The stainless steel has good heat manufacturing ability, weldability, and corrosion resistance, and large thermal neutron absorbing ability.

Dwg.1/1

Title Terms: STAINLESS; STEEL; THERMAL; NEUTRON; ABSORB; ABILITY; CONTAIN; MANGANESE; NICKEL; CHROMIUM; BORON; GADOLINIUM; ALUMINIUM; YTTRIUM; MOLYBDENUM; IRON

Derwent Class: K05; M27; X14

International Patent Class (Main): C22C-038/00

International Patent Class (Additional): C22C-038/54; G21C-007/24;

G21D-001/00

11/7,DE/8 (Item 3 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2002 Thomson Derwent. All rts. reserv.

004658335

WPI Acc No: 1986-161677/198625

Coronary artery disease and atherosclerosis diagnosis and location - by detecting porphyrin detecting agent absorbed by blood vessel wall

Patent Assignee: BETH ISRAEL HOSPITAL ASSOC (BETH-N)

Inventor: SPEARS J R

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4577636	A	19860325	US 84574682	A	19840127	198625 B

Priority Applications (No Type Date): US 84574682 A 19840127; US 82443958 A 19821123

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 4577636	A		4		

Abstract (Basic): US 4577636 A

Atherosclerosis is diagnosed by injecting a porphyrin soln. into the blood vessels to be examined, detecting the quantity of porphyrin absorbed by the vessels and contrasting it in different parts of the vessels to determine the location, size and quantity of the atheromatous plaques.

Porphyrins can carry a radioactive marker which can be detected by scintillation techniques. Suitable cpds. are of formula (I), (where Me=metal). This can be labelled with e.g.  $^{64}\text{Cu}$ ,  $^{14}\text{C}$ ,  $^3\text{H}$  or  $^{125}\text{I}$ . The porphyrin may also be detected by NMR, in which case Me in formula (I) could be Mn, Fe, Gd, Cr, Co, Ni, Ag, Eu or by Position Emission Tomography in which case markers on the porphyrin would be  $^{68}\text{Ga}$ ,  $^{11}\text{CO}$ ,  $^{13}\text{NH}_3$  and  $^{14}\text{C}$ -glucose. Further methods of detection are by X-ray contrast, in which case (I) is subst'd. by a contrast agent such as or by illuminating the blood vessels and detecting the fluorescence. The test may be made more specific by attaching to the porphyrin, an antibody specific to a component of the atheromatous plaques.

USE - Detection of coronary artery disease and atherosclerosis without the use of invasive (e.g. surgical) methods except when the porphyrins are detected by fluorescence.

Title Terms: CORONARY; ARTERY; DISEASE; ATHEROSCLEROSIS; DIAGNOSE; LOCATE;  
DETECT; PORPHYRIN; DETECT; AGENT; ABSORB; BLOOD; VESSEL; WALL  
Derwent Class: B04; P31  
International Patent Class (Additional): A61B-005/02; A61B-006/00

11/7,DE/9 (Item 4 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2002 Thomson Derwent. All rts. reserv.

001132974

WPI Acc No: 1974-06595V/197404

Stabilising formic acid - for storage in closed vessels, by addition of salts

Patent Assignee: BP CHEM INT LTD (BRPE )

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
NL 7309327	A	19740108				197404 B
DE 2333599	A	19740124				197405

Priority Applications (No Type Date): GB 7231703 A 19720706

Abstract (Basic): NL 7309327 A

Formic acid (I)  $\geq 80\%$  strength, is stabilised against decompn. to CO and H<sub>2</sub>O by dissolving in (I) a salt of a metal of Gp I or II with at. no is not  $>56$ , or of Zn, Cd, Mn, Fe Co, Ni or Gd with an anion which does not promote the decompn. of I. The stabilised (I) can safety be stored in closed vessels.

Title Terms: STABILISED; FORMIC; ACID; STORAGE; CLOSE; VESSEL; ADD; SALT

Derwent Class: E17

International Patent Class (Additional): B01J-001/16; C07C-051/50;  
C07C-053/02

?ds s12-

Set	Items	Description
S12	629	NIGD? ? OR GDNI? ?
S13	2	S12 AND (S1 OR S4 OR S5 OR S6)
S14	1	S13 NOT S10

?t s14/7,de/1

14/7,DE/1 (Item 1 from file: 103)  
DIALOG(R)File 103:Energy SciTec  
(c) 2002 Contains copyrighted material. All rts. reserv.

04255220 JPN-97-011067; EDB-98-012584

Title: [sup 161]Dy and [sup 155]Gd Moessbauer spectroscopy of the RTC[sub 2] intermetallics

Author(s): Onodera, Hideya; Amanai, Hidetaka; Matsuo, Satoru; Kosaka, Masashi; Ohashi, Masayoshi; Yamaguchi, Yasuo (Tohoku Univ., Sendai (Japan). Inst. for Materials Research); Kobayashi, Hisao

Source: Science Reports of the Research Institutes, Tohoku University, Series A v 45:1. Coden: SRTAA6 ISSN: 0040-8808

Publication Date: Mar 1997

p 1-10

Language: English

Abstract: [sup 161]Dy and [sup 155]Gd Moessbauer spectroscopic studies on DyCoC[sub 2], DyNiC[sub 2], GdCoC[sub 2] and GdNiC[sub 2] which were performed in order to obtain microscopic information on magnetic properties are reviewed. The experiments were done using the standard [sup 161]Tb and [sup 155]Eu Moessbauer sources prepared by neutron irradiation at the Japan Material Testing Reactor. A simple ferromagnetic DyCoC[sub 2] is a good object to compare the magnetic hyperfine field with the magnetic moment determined precisely by the magnetization measurement of the single crystalline sample. DyNiC[sub 2] is an antiferromagnet with commensurate magnetic structure and incommensurate moment-modulation structure. The magnetic hyperfine field changes correspondently well with the both magnetic structures. It is exhibited that the [sup 155]Gd Moessbauer spectroscopy is very useful to determine the moment direction in the Gd compounds which are rarely investigated by neutron diffraction because of large neutron absorption cross section of the natural Gd nuclei. The crystalline electric field parameter A[sub 2][sup 0] determined from the quadrupole interaction acting on Gd is also useful to interpret the magnetic anisotropy of the other rare earth atoms in the isostructural compounds. (author)

Descriptors: COBALT COMPOUNDS; CRYSTAL FIELD; CRYSTAL STRUCTURE; DYSPROSIUM 161; EXPERIMENTAL DATA; GADOLINIUM 155; HYPERFINE STRUCTURE; INTERMETALLIC COMPOUNDS; MOESSBAUER EFFECT; NICKEL COMPOUNDS

Broader Terms: ALLOYS; DATA; DYSPROSIUM ISOTOPES; EVEN-ODD NUCLEI; GADOLINIUM ISOTOPES; INFORMATION; INTERMEDIATE MASS NUCLEI; ISOTOPES; NUCLEI; NUMERICAL DATA; RARE EARTH NUCLEI; STABLE ISOTOPES; TRANSITION ELEMENT COMPOUNDS